BRITISH MEDICAL ASSOCIATION'S COHORT STUDY OF 2006 MEDICAL GRADUATES: LONGITUDINAL ANALYSIS OF CAREER TRAJECTORIES

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EXECUTIVE SUMMARY

This report presents the findings of a *longitudinal* analysis of the *ten years* of the BMA's 2006 Cohort Study of Medical Graduates, which has been undertaken by an independent team of researchers from the Universities of Sheffield and York. The longitudinal analysis focuses on the *career trajectories* of the medical graduates over the ten year period of the cohort study. Specifically, it is concerned with establishing:

- the range of career trajectories and changes within;
- the drivers behind different career trajectories and changes within;
- the relationship between career intentions and career behaviour.

Due to its robustness relative to other variables, the analysis highlights in particular gender dimensions of career trajectories. Section1 presents the key findings. Section 2 provides background information on the BMA's 2006 Cohort Study. Section 3 explains the conceptual and methodological approach adopted in the longitudinal analysis. Section 4 presents the results of the descriptive longitudinal analysis in two parts. Firstly, it examines patterns of change over time in the *intentions* of the junior doctors towards their careers, focusing on: their ultimate career goals, their intended area of medicine, their intention to work overseas and their intention to work outside the NHS. Secondly, it examines patterns of change over time in the *actual behavioural choices* of the doctors surveyed towards their careers, focusing on: career moves, including career breaks and overseas working; speciality moves; and career progression. Section 5 presents the results of the multivariate analysis undertaken to examine the impact of socio-demographic factors on career decisions taken by junior doctors over time. Section 6 situates the findings reported in the previous section in a wider social policy context, focusing on two areas in particular: workforce and morale (including NHS funding, pay, working hours, staffing, recruitment), and the gendered characteristics of junior doctors' career trajectories. We juxtapose external policy drivers (within health policy, immigration and family policy) and their hypothesised impacts with the evidence from the longitudinal analysis of the cohort study. Section 7 finally, highlights areas for further research.

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1.1 Career Intentions

1.1.1 Ultimate Career Goals (Tables 4.1 to 4.5)

- The junior doctors' ultimate career goals change over time, and the more time elapses from beginning training, the more goals change.
- The biggest changes are in respect of General Practice, with only 10 per cent of those who began their training with the ultimate career goal to become a GP retaining that goal 10 years later.
- Most of those who switch from wanting to be GPs, want to be SAS doctors ten years later (45 per cent), and just over one-fifth want to be Consultants.
- The goal of being a Consultant is the most stable over time, although even in respect of this 39 per cent who set out to be Consultants have switched their career goal after 10 years.
- There are clear gender differences, with women more likely than men to switch their ultimate career goal year by year and across the full 10 year period.

1.1.2 Intended Area of Medicine (Tables 4.6 to 4.10)

- The decline over time in preference for General Practice is also evidenced in responses to a question about intended area of medicine, with only 27 per cent of those who started out wanting to work in General Practice still wanting to 10 years later.[1]
- In contrast, there was considerably more stability over time in the intention to practise hospital-based medicine, with 43 per cent of those still intending to do so after 10 years.
- More men prefer hospital-based practice over the ten-year period; more women prefer General Practice.
- Women are more likely than men to change their intended area of medicine (focusing only on hospital-based medicine versus General Practice) over time.

1.1.3 Intention to work overseas (Tables 4.11 to 4.13)

- The junior doctors' interest in international professional mobility, either on a temporary or a permanent basis, wanes over time.
- Men are more likely to consider a temporary or permanent move to work overseas than are women.

[1] The different figures in 1.1.1 and 1.1.2 with regard to General Practice suggests that respondents interpreted differently the question about ultimate career goal and intended area of medicine.

- Those with a non-white background are more likely to consider a temporary or permanent move to work overseas than are those with a white background.

1.1.4 Intention to work outside the NHS (Tables 4.14 to 4.16)

- As time progresses, intention to work outside the NHS as part of their medical careers (e.g. in the independent sector) increases: almost a third of those who did not consider it at the beginning of their training, intend to do so 6 years later (the question was only included in the first 6 waves of the study).
- The increase in the intention to practise medicine outside the NHS is driven more by a higher intention of male and white junior doctors than by their female and non-white counterparts.
- There is more stability over time in intentions to work outside the NHS outside of their medical careers (e.g. in an alternative non-medical career): only around 6 per cent of those who did not consider it at the beginning of their training intend to do so 6 years later.
- More women and non-white doctors consider working outside the NHS outside of their medical career at any point in time than is the case for male and white doctors.

1.2 Career Behaviour

1.2.1 Career moves (Tables 4.17 to 4.20)

- The vast majority of the junior doctors (71 per cent) remain working as doctors in the UK 10 years after beginning their training. Only 1 per cent has left medicine as a career; the remainder have taken a career break or gone overseas.
- Over one-fifth of the sample report having taken a career break.
- There is a strongly gendered pattern of taking a career break, with more women than men taking breaks (28 per cent compared to 10 per cent), and women taking longer breaks than men.
- Only about 5 per cent of the junior doctors spent any time working overseas.
- Working overseas was more common among male junior doctors than their female counterparts.
- At the end of the ten years, more women had left medicine than men, although the percentage for both was very small (1.5 per cent for women, 0.1 per cent for men).
- Career moves across years are more likely to be influenced by gender rather than ethnicity.

1.2.2 Speciality moves (Tables 4.21 to 4.24)

- More men than women choose Hospital Practice; more women than men choose General Practice.

- More non-white doctors choose Hospital Practice than white ones; more white doctors choose General Practice.
- Compared to their *intentions*, the junior doctors' *behaviour* is relatively stable overtime when it comes to area of speciality.
- General Practice is the most stable speciality: between 2011 and 2015 (the period these data are available for), there is virtually no movement out of General Practice.
- In the same period, about 5 per cent of those working in Hospital Practice moved into General Practice.
- Women doctors are more than twice as likely as their male counterparts to move from Hospital to General Practice.

1.2.3 Career progression (Tables 4.25 to 4.28)

- Career progression is highly gendered, with men almost twice as likely as women to move from SAS doctors to Consultants in the 6 years for which we have these data.
- Very few junior doctors move out of a GP position.
- Women are more likely than men to move from SAS to GP positions.

1.3 Explaining career behaviour (Tables 5.1 to 5.2 and Figures 5.1 to 5.4)

- The number of children is a strong predictor of female junior doctors' career behaviour in terms of working overseas, taking a career break and speciality move.
- The number of children has no impact on male doctors' career behaviour.
- A representative male doctor with the same observable characteristics as his female counterpart is significantly less likely to take a career break.
- Non-white male doctors are more likely to take a career break than their white counterparts.
- Intentions to work overseas are very strong predictors of actual career choices of working or travelling overseas. This association is gendered, being twice as strong for male doctors than for their female counterparts.
- Male doctors with home ownership are less likely to travel overseas compared to tenants.
- A representative male doctor with the same observable characteristics as his female counterpart is significantly more likely to work overseas.

2. BACKGROUND TO THE COHORT STUDY

In 2006, the British Medical Association (BMA) embarked upon a study to track the careers of a cohort of UK medical graduates. The original sample consisted of 435 recent graduates who were each sent an initial survey. This was followed by nine additional surveys sent on an annual basis between 2007 and 2015. Each survey round achieved strong response rates and only minor levels of attrition have been observed; the last survey in 2015 elicited 358 responses.

The overarching objective of the cohort study was to provide information on the careers of doctors, particularly focussing on choices or changes regarding participants' careers and/or jobs, including: identifying doctors who leave medicine as a career, or who choose to work in another country, and to assess the factors which influence it; identifying patterns of workforce participation and speciality choice of doctors who remain in the UK, and the factors which influence them; and investigating career progression, especially those factors which influence variation between doctors.

Additionally, the surveys included questions relating to attitudes, future plans and views on policy issues. Some of the questions were repeated every year, whilst others were included a smaller number of times or on a single occasion. The dataset also contains detailed demographic information. The annual surveys were combined with focus groups, conducted with a random sub-sample of the cohort each year. The focus groups allowed for questions to be examined in greater depth, and also played a role in informing questionnaire development.

Each year of survey data has been analysed by the BMA's in house research team. The reports are available online.

3. INTRODUCTION TO THE LONGITUDINAL ANALYSIS

This report presents the findings of a *longitudinal* analysis of the *ten years* of the 2006 Cohort Study of Medical Graduates, which has been undertaken by an independent team of researchers from the Universities of Sheffield and York.

The longitudinal analysis focuses on the *career trajectories* of the medical graduates over the ten year period of the cohort study. Specifically, it is concerned with establishing:

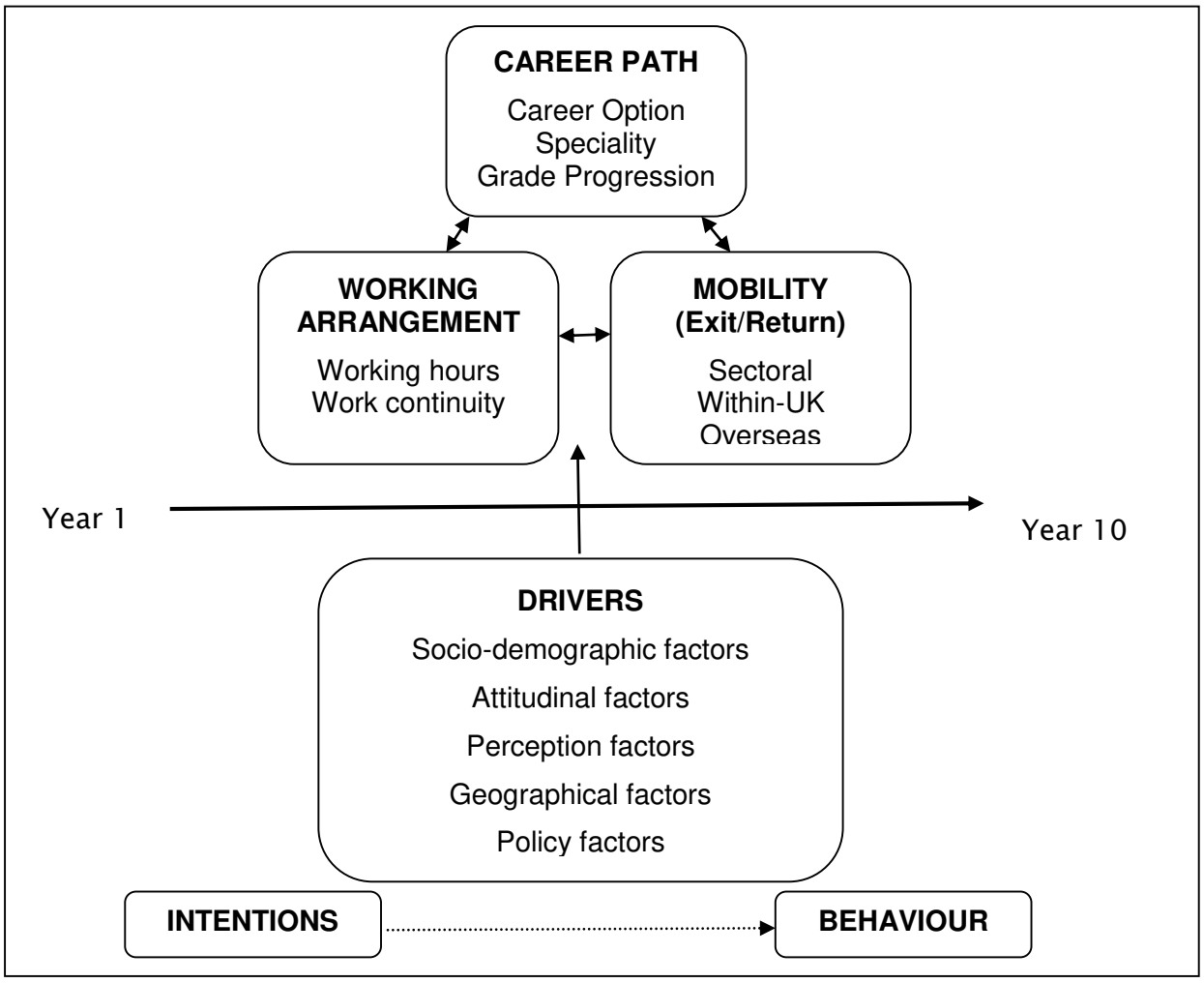
- the range of career trajectories and changes within;
- the drivers behind different career trajectories and changes within;
- the relationship between career intentions and career behaviour.

Figure 3.1 shows the conceptual framework informing the analysis. The framework understands junior doctors' career trajectories as having as their core dimension a 'career path', encompassing career option (e.g. hospital medicine, General Practice, research / academic medicine), speciality and grade progression (see Appendix 1 for training pathways). To capture the complexity, including the propensity for change, of contemporary careers, the model includes two further dimensions: the first is working arrangement, which encompasses patterns in working hours (e.g. full-time / part-time) and work continuity (e.g. career breaks); the second is mobility, which is understood as both sectoral and geographical (within-UK and overseas), and as incorporating both exit and return. Drivers are understood as including socio-demographic characteristics (e.g. gender, parental status, ethnicity), attitudes towards work and the practice of medicine, perceptions of the workplace environment and the specific demands of the role performed, geographical location and changes in the policy context affecting the medical profession over the period of time covered by the cohort study.

While the framework informs the analysis, the ability to apply it in its entirety is inevitably constrained by the particularities of the dataset. Three issues in particular are important to note. Firstly, while the dataset includes a large number of variables, which are relevant to the framework, a limited range of these is available for all ten years of the cohort study. This restricts the number of variables that are useful for longitudinal analysis (see Appendix 2 for a full list of the variables used). Secondly, while as noted in the Background section, the study was affected by only minor levels of attrition across the ten years, because the sample size was relatively small to begin with, depletion of sample numbers over time means that sample sizes for some variables are too small to allow for robust statistical analysis. In particular, this impacts on the ability to examine the drivers of trajectories. Thus for example, while we can analyse most if not all variables by gender, we are more

limited in our capacity to do so by ethnicity, and analysis by geographical location is not possible at all. A third and final issue relates to the questionnaire design, which is not consistent across years in its structure. Specifically, we find that variations over time in the location of key questions results in some years these key questions being asked to the whole sample, but in other years them being asked only to a sub-sample because of filtering. This filtering renders sample sizes in some variables too small for analysis purposes, impacting the depth to which we can examine some elements of career trajectories. Most notably, as a result of filtering, we are unable to examine full-time versus part-time working arrangements.

Figure 3.1: Analysis of doctors' career trajectories: conceptual framework



4. FINDINGS: DESCRIPTIVE RESULTS

This section presents the results of the descriptive analysis. It is divided into two sub-sections. The first examines patterns of change over time in the *intentions* of the junior doctors towards their careers. The second examines patterns of change over time in the *actual behavioural choices* of the doctors surveyed towards their careers. All the variables analysed have been chosen trying to strike the best compromise between their substantive interest in light of the conceptual framework informing the analysis (Figure 3.1) and their long term presence in the cohort study.

In the tables and commentary below, a common longitudinal-data reporting notation is used to denote change in time, with "t" representing the first reference year, "t+1" representing one year on from "t", "t+2" representing two years on from "t", and so on, up to "t+9" representing nine years on from "t". For most variables, "t" refers to 2006, which is the first year of the cohort study. Some variables, however, do not appear at the beginning, so "t" will refer to a different year, whichever year the variable first appears in the data set (please refer to Appendix 3 for further discussion).

4.1 Career intentions of junior doctors over time

The following section examines patterns of change over time in the *intentions* of the junior doctors towards their careers, focusing on: their ultimate career goals, their intended area of medicine, their intention to work overseas and their intention to work outside the NHS.

4.1.1 Changes in ultimate career goals

Key Findings

- The junior doctors' ultimate career goals change over time, and the more time elapses from beginning training, the more goals change.
- The biggest changes are in respect of General Practice, with only 10 per cent of those who began their training with the ultimate career goal to become a GP retaining that goal 10 years later.
- Most of those who switch from wanting to be GPs, want to be SAS doctors ten years later (45 per cent), and just over one-fifth want to be Consultants.
- The goal of being a Consultant is the most stable over time, although even in respect of this 39 per cent who set out to be Consultants have switched their career goal after 10 years.
- There are clear gender differences, with women more likely than men to switch their ultimate career goal year by year and across the full 10 year period.

Tables 4.1 to 4.5 report the changes over time in the ultimate career goals of the junior doctors surveyed. Given the number of career goals considered, we focus on changes between t and t+1 in the first table, and thereafter every two years, and we concentrate on the whole sample and the differences by gender. Sample sizes in respect of ethnicity are too small to provide meaningful results for this particular descriptive analysis.

All descriptive analyses looking at patterns of change and stability report the total number of observations for each transition matrix, as well as the total number of junior doctors whose attitudes or behaviours over time are being examined. For instance, for Table 4.1 below the total number of observations is 3,088 which corresponds to 417 doctors reporting on their ultimate career goals between two consecutive years. This amounts to 83 per cent of the total number of observations for this variable (n observations=3,715) and 95 per cent of the total sample of junior doctors surveyed (n doctors=440) during the ten years of the study.

Changes in ultimate career goals over two years

Looking at changes in the ultimate career goal of junior doctors in the first two years (between t and t+1) (Table 4.1), it turns out that of those who reported they wanted to be consultant at t, a sizable 86 per cent retain the same view at t+1. Out of the 14 per cent originally wanting to be a consultant who changed their response, the largest switch is to other or undecided. With regards to gender differences, it is worth noting that more men than women continue to want to be consultants between t and t+1, although the difference is not very large. The other ultimate career goals show less stability between t and t+1 than that of wanting to become a consultant: of those reporting at t that their goal is to be a SAS doctor, a GP, or an academic, the percentage retaining that goal at t+1 is 84, 47, and 44 per cent respectively. Those who remain other / undecided between t and t+1 is 34 per cent. Female junior doctors are overall more likely to change their ultimate career goal than their male counterparts between t and t+1. Looking at what ultimate career goals junior doctors change to, for instance, for those who said at t that they wanted to be GPs, the 53 per cent that changes by t+1 is distributed as follows: 14 per cent change to consultant, 21 per cent to SAS doctors, 6 per cent to an academic post and 11 per cent to other or undecided.

At the bottom of the table we report two statistical measures of associations for the overall transitions between t and t+1 and also for male and female doctors (please refer to Appendix 3 for further discussion of these tests). In all cases the χ^2 indicates that there is a strong statistical association between the patterns of stability and change found between t and t+1. Also, the Cramer's V provides

further proof for the statistical association found since they vary between 0.52 and 0.55 which is quite high (Cramer's V ranges between 0 for no association to 1 for a perfect association between the two variables cross-tabulated).

Table 4.1. Changes over time in ultimate career goal between t and t+1 (%) (n obs=3,088 / n doctors=417)

		At t+1				
At t		Consultant	SAS doctors	GPs	Academic	Other/Undecided
Consultant	All	86.08	1.62	3.50	3.56	5.24
	Male	88.22	1.01	2.73	2.87	5.17
	Female	84.44	2.10	4.08	4.08	5.30
SAS doctors	All	1.83	84.30	1.98	8.69	3.20
	Male	1.17	85.38	2.34	7.60	3.51
	Female	2.06	83.92	1.86	9.07	3.09
GPs	All	13.68	21.58	47.11	6.38	11.25
	Male	16.24	16.24	55.56	4.27	7.69
	Female	12.26	24.53	42.45	7.55	13.21
Academic	All	20.55	19.18	10.50	43.84	5.94
	Male	22.73	12.12	13.64	45.45	6.06
	Female	19.61	22.22	9.15	43.14	5.88
Other/Undecided	All	27.30	13.48	14.89	10.28	34.04
	Male	35.71	11.90	13.10	9.52	29.76
	Female	23.74	14.14	15.66	10.61	35.86

All: Pearson χ^2 (16): 3,500 p<0.00 // Cramer's V: 0.53
Male: Pearson χ^2 (16): 1,400 p<0.00 // Cramer's V: 0.55
Female: Pearson χ^2 (16): 2,100 p<0.00 // Cramer's V: 0.52

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in ultimate career goals over four years

Table 4.2 shows the changes in the ultimate career goals of junior doctors over four years (between t and t+3). The overall pattern is one of change in ultimate career goals, with women more likely to consider change to their ultimate career goal than men. For example, for those who reported they wanted to be GPs at t, only 20 per cent retain that goal three years later. By gender, the figures amount to 32 per cent of male junior doctors, but only 13 per cent of female junior doctors. Overall, those switching their intentions do so towards SAS doctors (46 per cent), followed by consultant (17 per cent), academic (11 per cent), associate specialist (10 per cent), and other / undecided (7 per cent).

With regards to the statistical significance of the patterns found, they are all significant as reported by the Pearson's χ^2 and the Cramer's V. The statistical association though weakens as compared with the patterns of stability and change found in the ultimate career goals between t and t+1. However, this may result from working with smaller sample sizes rather than being the consequence of any substantive reason. As we see, sample attrition has gone up as we are looking at transitions between four years. The sample size drops to 2,367, 64 per cent of the total number of observations for this variable. This corresponds to 394 junior doctors or 89 per cent of the total sample of junior doctors.

Table 4.2. Changes in ultimate career goal between t and t+3 (%) n obs=2,367 / n doctors=394)

		At t+3				
At t		Consultant	SAS doctors	GPs	Academic	Other/Undecided
Consultant	All	81.42	5.90	4.44	4.60	3.63
	Male	85.31	3.20	4.52	3.01	3.95
	Female	78.50	7.92	4.38	5.80	3.39
SAS doctors	All	2.22	81.15	2.22	12.20	2.22
	Male	2.48	77.69	2.48	14.88	2.48
	Female	2.12	82.42	2.12	11.21	2.12
GPs	All	17.29	46.24	19.92	9.77	6.77
	Male	16.33	37.76	31.63	9.18	5.10
	Female	17.86	51.19	13.10	10.12	7.74
Academic	All	31.13	19.21	13.91	31.13	4.64
	Male	30.95	11.90	16.67	35.71	4.76
	Female	31.19	22.02	12.84	29.36	4.59
Other/Undecided	All	33.33	23.75	8.05	24.52	10.34
	Male	44.44	20.99	6.17	16.05	12.35
	Female	28.33	25.00	8.89	28.33	9.44

All: Pearson χ^2 (16): 1,500 p<0.00 // Cramer's V: 0.40
Male: Pearson χ^2 (16): 632 p<0.00 // Cramer's V: 0.42
Female: Pearson χ^2 (16): 911 p<0.00 // Cramer's V: 0.39

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in ultimate career goals over six years

Table 4.3 shows changes in the ultimate career goals of the junior doctors surveyed over six years. Once again we see that more doctors are likely to report a change as the time elapsed increases. For instance, 78 per cent of those who reported they wanted to be consultants at time t remain with the same goal five years later, leaving 22 per cent who change to other career goals (with the largest group, 8 per cent, moving to a SAS doctor occupation). If we look again at those who reported their career goal was to be a GP, only 16 per cent remain with the same goal after six years. The other 84 per cent changed their career goals as follows: 14 per cent to consultant; 59 per cent to SAS doctor; 9 per cent to associate specialist; 8 per cent to academic; 3 per cent to other / undecided. As for gender differences, within an overall pattern of increasing change, women appear again more likely to change their career goals than their male counterparts.

The statistical tests indicate that the observed patterns of stability and change over the six years are significant both when considering the Pearson's χ^2 and the Cramer's V shown at the bottom of Table 4.3. As for the sample size, attrition has increased as we are looking at transitions over six years. The sample size drops to 1,665, 49 per cent of the total number of observations for this variable. This corresponds to 391 junior doctors or 88 per cent of the total sample of junior doctors.

Table 4.3 Changes in ultimate career goal between t and t+5 (%) (n obs=1,665 / n doctors=391)

	At t+5				
At t	Consultant	SAS doctors	GPs	Academic	Other/Undecided

Consultant	All	78.00	8.08	5.16	5.39	3.37
	Male	83.24	3.46	6.12	3.46	3.72
	Female	74.17	11.46	4.47	6.80	3.11
SAS doctors	All	4.84	75.81	2.82	12.50	4.03
	Male	4.29	75.71	1.43	14.29	4.29
	Female	5.06	75.84	3.37	11.80	3.93
GPs	All	13.89	58.80	15.74	8.33	3.24
	Male	14.67	50.67	22.67	9.33	2.67
	Female	13.48	63.12	12.06	7.80	3.55
Academic	All	30.12	20.48	10.84	31.33	7.23
	Male	30.77	11.54	19.23	30.77	7.69
	Female	29.82	24.56	7.02	31.58	7.02
Other/Undecided	All	34.32	27.54	10.59	22.03	5.51
	Male	47.22	15.28	15.28	18.06	4.17
	Female	28.66	32.93	8.54	23.78	6.10

All: Pearson χ^2 (16): 848 p<0.00 // Cramer's V: 0.36
Male: Pearson χ^2 (16): 377 p<0.00 // Cramer's V: 0.39
Female: Pearson χ^2 (16): 485 p<0.00 // Cramer's V: 0.34

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in ultimate career goals over eight years

Table 4.4 reports the changes in the ultimate career goals of junior doctors over a period of eight years. Results again confirm that intention changes are more likely over time, and that women are more likely to change intentions than male doctors. For instance, of those reporting at t that they wanted to be GPs only 7 per cent remain with the same goal after eight years. Those who change, switch towards SAS doctors (66 per cent), consultants (15 per cent), academics (9 per cent), and 2 per cent are other / undecided.

The statistical tests shown at the bottom of table 4.4 indicate that the patterns of change and stability found over the period of eight years analysed are statistically significant both for the overall sample of junior doctors and for male and female doctors, separately. As for the sample size, attrition has increased as we are looking at transitions between eight years. The sample size drops to 984, 26 per cent of the total number of observations for this variable. This corresponds to 383 junior doctors or 87 per cent of the total sample of junior doctors.

Tables 4.4. Changes in ultimate career goal between t and t+7 (%) (n obs=984 / n doctors=383)

	At t+7				
At t	Consultant	SAS doctors	GPs	Academic	Other/Undecided

Consultant	All	70.72	11.05	7.55	7.00	3.68
	Male	78.17	5.68	7.86	6.11	2.18
	Female	65.29	14.97	7.32	7.64	4.78
SAS doctors	All	14.86	50.00	4.05	24.32	6.76
	Male	9.09	59.09	4.55	18.18	9.09
	Female	17.31	46.15	3.85	26.92	5.77
GPs	All	15.25	66.10	7.34	9.04	2.26
	Male	18.97	56.90	10.34	10.34	3.45
	Female	13.45	70.59	5.88	8.40	1.68
Academic	All	25.00	8.33	41.67	16.67	8.33
	Male	37.50	0.00	37.50	12.50	12.50
	Female	0.00	25.00	50.00	25.00	0.00
Other/Undecided	All	40.10	27.60	7.81	17.71	6.77
	Male	51.85	20.37	11.11	11.11	5.56
	Female	35.51	30.43	6.52	20.29	7.25

All: Pearson χ^2 (16): 335 p<0.00 // Cramer's V: 0.29
Male: Pearson χ^2 (16): 144 p<0.00 // Cramer's V: 0.31
Female: Pearson χ^2 (16): 198 p<0.00 // Cramer's V: 0.28

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in ultimate career goals over ten years

Finally, Table 4.5 shows the change in the ultimate career goals of junior doctors over a period of ten years. In this case the sample size is very small and that explains why for a good number of career goals we do not have meaningful data to allow comparison. Indeed, for the cases that we can look at we observe fewer changes than for shorter periods but this can be the results of self-selection whereby those junior doctors likely to remain in the sample and respond to the question on ultimate career goals are those with clearer ideas about future plans. Yet, the data seem to suggest that women are again more likely to change their career goals over time than their male counterparts.

The statistical test shown at the bottom of Table 4.5 indicate that the patterns of change and stability found over the period of ten years covered by the panel are statistically significant for the overall sample of junior doctors and for female and male doctors as well. As for the sample size, attrition has increased as we are looking at transitions over ten years. The sample size drops to 339, which is just 9 per cent of the total number of observations for this variable. This corresponds to 339 junior doctors who have remained in the panel between t and t+9, representing 77 per cent of the total sample of junior doctors.

Table 4.5. Changes in ultimate career goal between t and t+9 (%) (n obs=339 / n doctors=339)

		At t+9				
At t		Consultant	SAS doctors	GPs	Academic	Other/Undecided
Consultant	All	61.31	14.57	7.04	8.04	9.05
	Male	67.53	11.69	6.49	6.49	7.79

	Female	57.38	16.39	7.38	9.02	9.84
	All	33.33	33.33	0	0	33.33
SAS doctors	Male	0	0	0	0	0
	Female	33.33	33.33	0.00	0.00	33.33
	All	21.74	44.93	10.14	17.39	5.80
GPs	Male	20.83	33.33	12.50	25	8.33
	Female	22.22	51.11	8.89	13.33	4.44
	All	50	0	50	0	0
Academic	Male	50	0	50	0	0
	Female	0	0	0	0	0
	All	31.75	22.22	9.52	28.57	7.94
Other/Undecided	Male	41.18	17.65	17.65	11.76	11.76
	Female	28.26	23.91	6.52	34.78	6.52

All: Pearson χ^2 (16): 72 p<0.00 // Cramer's V: 0.23
Male: Pearson χ^2 (16): 29 p<0.04// Cramer's V: 0.28
Female: Pearson χ^2 (16): 47 p<0.00 // Cramer's V: 0.27

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.1.2 Changes in intended area of medicine

Key Findings

- Only 27 per cent of those who started out wanting to work in General Practice still want to 10 years later. Of those who switched after 10 years, by far the largest group now had 'no clear idea' of the area of medicine they wished to work in.
- There was considerably more stability over time in the intention to practise hospital-based medicine, with 43% of those still intending to do so after 10 years.
- More men prefer hospital-based practice over the ten-year period; more women prefer General Practice.
- Women are more likely than men to change their intended area of medicine (focusing only on hospital-based medicine versus General Practice) over time.

In the next five tables (Table 4.6 to 4.10) we examine changes in intended area of medicine. From the original variable we have collapsed some categories due to small numbers of respondents, and we are left with the following: hospital, General Practice, other and no clear idea.

Changes in intended area of medicine over two years

There are clear gender differences when comparing hospital versus General Practice as the preferred career options of junior doctors after two years (between t and t+1) (Table 4.6): more men than women prefer hospital to General Practice, whereas for General Practice it is the other way around. As we found above, here too women are slightly more undecided than men. Interestingly, there is also more stability in those preferring hospital than General Practice over the first two years. As for the gendered

pattern of switching intentions between these two career options, it turns out that more women than men move from hospital to General Practice and more men than women move from General Practice to hospital.

This pattern of change and stability found after two years is statistically significant for the whole sample of junior doctors as well as for the male and female doctors separately as reported in the statistical test shown at the bottom of Table 4.6. As for sample attrition between two consecutive years the total number of observations is 1,580, which corresponds to 412 doctors reporting on their preferred general area of medicine between t and t+1. This amounts to 63 per cent of the total number of observations for this variable (n observations=2,521) and 94 per cent of the total sample of junior doctors surveyed (n doctors=440) during the ten years of the study.

Table 4.6. Changes in preferred area of medicine between t and t+1 (%) (n obs=1,580 / n doctors=412)

		At t+1			
At t		Hospital	General Practice	No clear idea	Other
	All	81.28	8.81	4.68	5.22
Hospital	Male	82.21	7.01	4.31	6.47
	Female	80.66	10.04	4.93	4.38
	All	10.90	78.46	5.85	4.79
General Practice	Male	16.51	76.15	0.92	6.42
	Female	8.61	79.40	7.87	4.12
	All	38.69	22.61	31.16	7.54
No clear idea	Male	45.45	18.18	30.30	6.06
	Female	35.34	24.81	31.58	8.27
	All	25.97	4.97	4.97	64.09
Other	Male	25.33	2.67	6.67	65.33
	Female	26.42	6.60	3.77	63.21

All: Pearson χ^2 (9): 1,100 p<0.00 // Cramer's V: 0.48
Male: Pearson χ^2 (9): 424 p<0.00 // Cramer's V: 0.49
Female: Pearson χ^2 (9): 695 p<0.00 // Cramer's V: 0.48

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in intended area of medicine over four years

In Table 4.7 below we report the patterns of change and stability in the preferred area of medicine of the junior doctors surveyed over four years. The data confirm that over time junior doctors, overall, are more inclined to change their preferred area of medicine, and that women are more likely than men to do so. Also, men remain more inclined to opt for a hospital occupation than their female counterparts, who are, on the contrary, more attracted to developing their careers in General Practice. This gendered pattern results from the combination of on the one hand, more male doctors than females remaining with hospital practice as their preferred area of medicine after two years, and on the other hand, more female doctors than male doctors switching from hospital to General Practice as their preferred area of medicine in the two year time span analysed.

The statistical test shown at the bottom of Table 4.7 indicates that the patterns of change and stability found over four years are statistically significant for the whole sample of junior doctors, as well as for male and female doctors separately. Sample attrition has increased as we are looking at transitions between four years. The sample size drops to 1,132, which is 45 per cent of the total number of observations for this variable. This corresponds to 386 junior doctors or 88 per cent of the total sample of junior doctors interviewed during the ten years of the study.

Table 4.7. Changes in preferred area of medicine between t and t+3 (%) (n=1,132 / n doctors=386)

		At t+3			
At t		Hospital	General Practice	No clear idea	Other
	All	69.30	12.07	8.05	10.58
Hospital	Male	70.94	9.06	6.79	13.21
	Female	68.23	14.04	8.87	8.87
	All	11.20	70.95	9.54	8.30
General Practice	Male	17.39	65.22	7.25	10.14
	Female	8.72	73.26	10.47	7.56
	All	43.62	28.19	11.41	16.78
No clear idea	Male	46.15	21.15	11.54	21.15
	Female	42.27	31.96	11.34	14.33
	All	34.21	10.53	9.65	45.61
Other	Male	34.09	6.82	11.36	47.73
	Female	34.29	12.86	8.57	44.29

All: Pearson χ^2 (9): 444 p<0.00 // Cramer's V: 0.36
Male: Pearson χ^2 (9): 166 p<0.00 // Cramer's V: 0.37
Female: Pearson χ^2 (9): 278 p<0.00 // Cramer's V: 0.36

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in intended area of medicine over six years

Table 4.8 reports changes during a period of six years in the preferred area of medicine of the junior doctors surveyed. We observe that there is an increase in the rate of change as time progresses. At this point, however, there are no gender differences in the share of junior doctors who remain wanting to pursue a career in hospital. The gender difference, though, persists if we look at those who remain wanting to work in General Practice, or who change from hospital to General Practice.

The patterns of change and stability found for the whole sample of junior doctors, as well as for male and female doctors separately for the period of six years analysed, are statistically significant as shown in the statistical test at the bottom of Table 4.8. Sample attrition has increased as we are looking at transitions over six years. The sample size drops to 693, which is 27 per cent of the total number of observations for this variable. This corresponds to 368 junior doctors or 84 per cent of the total sample of junior doctors surveyed during the ten years of the study.

Table 4.8. Changes in preferred area of medicine between t and t+5 (%) (n obs=693 / n doctors= 368)

		At t+5

At t		Hospital	General Practice	No clear idea	Other
	All	58.25	17.96	10.44	13.35
Hospital	Male	58.64	10.49	11.73	19.14
	Female	58	22.80	9.60	9.60
	All	10.83	57.50	14.17	17.50
General Practice	Male	20	51.43	8.57	20
	Female	7.06	60	16.47	16.47
	All	45.53	32.52	8.94	13.01
No clear idea	Male	20	27.50	10	12.50
	Female	43.37	34.94	8.43	13.25
	All	37.97	12.66	11.39	37.97
Other	Male	39.29	7.14	14.29	39.29
	Female	37.25	15.69	9.80	37.25

All: Pearson χ^2 (9): 119 p<0.00 // Cramer's V: 0.24
Male: Pearson χ^2 (9): 49 p<0.00 // Cramer's V: 0.26
Female: Pearson χ^2 (9): 77 p<0.00 // Cramer's V: 0.24

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in intended area of medicine over eight years

Table 4.9 reports the patterns of change and stability in the preferred area of medicine over a period of eight years. Here the sample size is already quite small, which hinders the ability to draw solid conclusions. However, it seems gender differences lessen as time elapses. This is evident in those junior doctors that remain with the intention to work in hospital eight years after commencing training. Interestingly, there is also a reversal of the gender pattern previously observed: now, for those who remain with the intention to work in General Practice, more male doctors than female doctors intend to do so. However, as before, more women than men change from wanting to work in a hospital at the beginning of training to wanting to work in General Practice after eight years.

The patterns of change and stability found for the period of eight years analysed remain statistically significant even though for male doctors these are somewhat weaker (at 5 per cent significance) due most likely to the small sample size of male doctors remaining in the panel for eight years and answering the question on their preferred area of medicine between t and t+7. For the whole sample and for the sample of female doctors the levels of significance reported are at 1 per cent. Sample attrition has increased as we are looking at transitions between eight years. The sample size drops to 329, which is 13 per cent of the total number of observations for this variable. This corresponds to 228 junior doctors or 52 per cent of the total sample of junior doctors interviewed during the ten years of the study.

Table 4.9. Changes in preferred area of medicine between t and t+7 (%) (n obs=329 / n doctors=228)

		At t+7			
At t		Hospital	General Practice	No clear idea	Other
	All	50.22	13.97	15.28	20.52
Hospital	Male	47.73	9.09	17.05	26.14
	Female	51.77	17.02	14.18	17.02
General Practice	All	8.06	43.55	20.97	27.42

	Male	0	47.06	11.76	41.18
	Female	11.11	42.22	24.44	22.22
	All	36.59	26.83	12.20	24.39
No clear idea	Male	46.67	13.33	13.33	26.67
	Female	30.77	36.42	11.54	23.08
	All	30.30	3.03	21.21	45.45
Other	Male	44.44	0	22.22	33.33
	Female	25	4.17	20.83	50

All: Pearson χ^2 (9): 49 p<0.00 // Cramer's V: 0.22
Male: Pearson χ^2 (9): 19 p<0.03 // Cramer's V: 0.23
Female: Pearson χ^2 (9): 39 p<0.00 // Cramer's V: 0.25

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Changes in intended area of medicine over ten years

Finally, Table 4.10 shows the patterns of change and stability in the junior doctors' preferred area of medicine over the period of ten years covered in the panel. The reduced sample size is evident in that some cells have no observations. We observe that there are more women who want to remain in hospital occupations in the ten year time span analysed, and more men than women who change from hospital at time t to General Practice at t+9. Yet, there are more women than men who still prefer General Practice over ten years (in fact, there are no men in this case reporting a preference for General Practice between t and t+9).

The reduced sample size is most likely the reason why the Pearson χ^2 is not significant either for the whole sample of junior doctors or for male and female doctors separately. However, the Cramer's V as a measure of association between the preferred areas of medicine over time still suggests a positive association over time between these preferences. As for the sample size, attrition has increased as we are looking at transitions between t and t+9. The sample size drops to 144 observations, which corresponds to 6 per cent of the total number of observations for this variable and 33 per cent of the total sample of junior doctors interviewed during the ten years of the study.

Table 4.10. Changes in preferred area of medicine between t and t+9 (%) (n obs=144 / n doctors=144)

		At t+9			
At t		Hospital	General Practice	No clear idea	Other
	All	43.37	12.05	16.87	27.71
Hospital	Male	35.71	14.29	17.86	32.14
	Female	47.27	10.91	16.36	25.45

	All	18.18	27.27	36.36	18.18
General Practice	Male	0	0	66.67	33.33
	Female	25	37.50	25	12.50
	All	48.48	24.24	9.09	18.18
No clear idea	Male	50	16.67	8.33	25
	Female	47.62	28.57	9.52	14.29
	All	38.89	11.11	22.22	27.78
Other	Male	57.14	0	14.29	28.57
	Female	27.27	18.18	27.27	27.27

All: Pearson χ^2 (9): 11 p<0.28 // Cramer's V: 0.16
Male: Pearson χ^2 (9): 8 p<0.50 // Cramer's V: 0.24
Female: Pearson χ^2 (9): 9 p<0.42 // Cramer's V: 0.18

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.1.3 Changes in intentions to work overseas

Key Findings

- The junior doctors' interest in international professional mobility, either on a temporary or a permanent basis, wanes over time.
- Men are more likely to consider a temporary or permanent move to work overseas than are women.
- Those with a non-white background are more likely to consider a temporary or permanent move to work overseas than are those with a white background.

Table 4.11 below reports the changes over time in the respondents' intentions to work outside the UK at any point in their careers. The analysis considers first the whole sample, and then presents the results stratified by gender and ethnicity. [2] It also differentiates between intentions to work overseas temporarily and permanently.

For the whole sample of junior doctors the pattern that emerges is a clear willingness to consider working outside the UK temporarily within the first five years of training (up to t+4). Thereafter, they appear to be more reluctant to consider leaving the UK to work somewhere else temporarily. With regards to respondents' gender and ethnic background, the results suggest that men are more likely to consider working outside the UK temporarily than are women. And, the same appears to be the case for those junior doctors with a non-white background as compared to those with a white background. In both cases, however, the same pattern as for the whole sample is confirmed: the willingness to work outside the UK temporarily decreases over time. However, the decline in the

[2] Due to small sample sizes, only two categories of ethnicity are used – white and non-white. A full description of the ethnic composition of the sample can be found in Appendix 3.

intention to work outside the UK appears earlier and is stronger when both gender and ethnic background are considered together.

As might be expected, the share of junior doctors willing to consider a permanent move is much smaller than that of a temporary one. Yet, results match those already discussed. For the whole sample of junior doctors the intention to consider working permanently outside the UK drops over time, being four times less ten years after commencement of training than it was at the beginning. As before, there are more male junior doctors intending to work outside the UK permanently than female ones. Interestingly, although for both genders we observe a considerable reduction over time in this intention, for male doctors this is much smaller than that for their female counterparts. Thus, the gender gap in intention to work permanently outside the UK one year into training (t+1) is negligible, but after ten years (t+9) it has increased to over 5 percentage points. In terms of ethnic background, white doctors are less likely to report a change in intentions to work outside the UK permanently at any point in the panel than their non-white counterparts, but for both, again, we observe a decline in intention to do so over time. In contrast to gender, however, the ethnicity gap narrows over time. Thus, white and non-white junior doctors become more alike over time when it comes to intentions to work outside the UK permanently.

Table 4.11. Changes over time in the willingness of junior doctors working outside the UK (%)

		Stay "not present plans" (at…)								
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*	*t+7*	*t+8*	*t+9*
Not present plans (at *t*)	All	86.18	84.24	83.05	84.26	86.57	85.31	83.37	80.71	81.95
	Male	84.38	81.12	78.68	79.42	80.48	78.82	75	70.71	71.11
	Female	87.07	85.81	85.32	86.84	89.87	88.89	88.21	86.19	87.50
	White	87.49	85.62	84.24	85.97	88.27	87.32	85.35	82.48	83.64
	Non-white	77.56	75.00	75.50	73.81	76.24	73.49	71.67	71.74	73.91
		Change to "yes, temporarily" (at…)								
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*	*t+7*	*t+8*	*t+9*
Not present plans (at *t*)	All	12.79	14.33	15.24	13.73	11.19	11.36	12.53	14.29	12.78
	Male	14.65	16.85	18.42	17.36	14.34	14.29	17.11	20.20	20
	Female	11.88	13.05	13.58	11.79	9.48	9.76	9.89	11.05	9.09
	White	11.47	13.00	14.20	12.34	9.93	9.82	11.27	13.25	10.91
	Non-white	21.46	23.26	21.85	22.22	18.81	20.48	20	19.57	21.74
		Change to "yes, permanently" (at…)								
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*	*t+7*	*t+8*	*t+9*
Not present plans (at *t*)	All	1.03	1.43	1.71	2.01	2.24	3.32	4.10	5	5.26
	Male	0.98	2.02	2.89	3.22	5.18	6.90	7.89	9.09	8.89
	Female	1.05	1.14	1.10	1.37	0.65	1.36	1.90	2.76	3.41
	White	1.04	1.39	1.57	1.69	1.79	2.86	3.38	4.27	5.45
	Non-white	0.98	1.74	2.65	3.97	4.95	6.02	8.33	8.70	4.35

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

In Table 4.12 below we report the evolution in the sample size for all the transitions considered in Table 4.11. We show the sample size both for the number of observations of the whole sample and also for the whole sample of junior doctors involved in those transitions over time. Focusing on the latter, the sample size of junior doctors represents around 95 per cent of the total number of junior doctors interviewed in the study for the transition between t and t+1, but reduces to 78 per cent between t and t+9.

Table 4.12. Sample size for the whole sample and all time periods considered: observations and individuals

Time period	N (observations)	N (doctors)
t to t+1	3,094	417
t to t+2	2,730	409
t to t+3	2,369	393
t to t+4	2,019	389
t to t+5	1,682	391
t to t+6	1,348	387
t to t+7	1,010	384
t to t+8	680	382
t to t+9	344	344

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Finally, in Table 4.13 below we show the statistical tests for the patterns of stability and change analysed in our main analysis reported in Table 4.11. All our transition matrices are statistically significant both for the overall sample and for the results stratified by gender and ethnicity. This is confirmed by the statistically significant Pearson χ^2. Besides, the Cramer's V test provides a numerical measure for the intensity of the patterns of stability and change found. Interestingly, these results suggest that there are clearly more changes in the sample of male and non-white doctors than for their female and white counterparts. That is, the former are more likely to report a higher willingness to change to work temporarily or permanently outside the UK from not having initially considered doing that, whereas female and white doctors report lesser intentions to work outside the UK either temporarily or permanently. This substantive interpretation stems from the higher Cramer's V calculated for males and non-white doctors.

Table 4.13. Statistical tests for the analysis shown in Table 4.11

	Pearson χ^2 (*)					Cramer's V				
	All	Male	Female	White	Non-White	All	Male	Female	White	Non-White
t to t+1	Yes	Yes	Yes	Yes	Yes	0.67	0.70	0.64	0.66	0.66
t to t+2	Yes	Yes	Yes	Yes	Yes	0.58	0.61	0.55	0.57	0.60
t to t+3	Yes	Yes	Yes	Yes	Yes	0.52	0.57	0.49	0.50	0.58
t to t+4	Yes	Yes	Yes	Yes	Yes	0.48	0.54	0.43	0.46	0.52
t to t+5	Yes	Yes	Yes	Yes	Yes	0.45	0.49	0.42	0.42	0.54
t to t+6	Yes	Yes	Yes	Yes	Yes	0.39	0.43	0.35	0.34	0.52
t to t+7	Yes	Yes	Yes	Yes	Yes	0.35	0.39	0.32	0.31	0.44
t to t+8	Yes	Yes	Yes	Yes	Yes	0.33	0.38	0.29	0.29	0.45
t to t+9	Yes	Yes	Yes	Yes	Yes	0.29	0.32	0.28	0.27	0.41

*Yes indicates Pearson χ^2 significant at least at 10%

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.1.4 Changes in intentions to work outside the NHS

Key Findings

- As time progresses, intention to work outside the NHS as part of their medical careers (e.g. in the independent sector) increases: almost a third of those who did not consider it at the beginning of their training intend to do so 6 years later (the question was only included in the first 6 waves of the study).
- The increase in the intention to practise medicine outside the NHS is driven more by a higher intention of male and white junior doctors than by their female and non-white counterparts.
- There is more stability over time in intentions to work outside the NHS outside of their medical careers (e.g. in an alternative non-medical career): only around 6 per cent of those who did not consider it at the beginning of their training intend to do so 6 years later.
- More women and non-white doctors consider working outside the NHS outside of their medical career at any point in time than is the case for male and white doctors.

In Table 4.14 we look at changes over time in junior doctors' intentions to work outside the NHS at any point in their career. This question was included in the first six waves of the panel, therefore, we are able to look at changes up to six years after beginning training (t+5). In particular, we look at change from saying "no" at time t to changing to "yes, as part of my medical career" between t+1 and t+5, and change between responding "no" at time t to responding "yes, outside my medical career" between t+1 and t+5. While, we might expect that doctors responding "yes" are envisaging work in the independent health-care sector, we do not know for certain, since the question is not asked.

The pattern of change over time that emerges for the whole sample of junior doctors who report that they intend working outside the NHS as part of their medical career (e.g. in the independent sector), is one of a steady increase. For those who did not consider working outside the NHS at the beginning of training (at t), 24 per cent consider that possibility one year on (at t+1). This percentage increases to 28 per cent after two years (at t+2), 29 per cent after three years (at t+3), and it is over 30 per cent after four and five years (at t+4 and t+5). This pattern of overall

increase seems to be driven more by a higher preference of male and white junior doctors than by their female and non-white junior doctor counterparts.

With regards to working outside the NHS outside of their medical career (e.g. in an alternative non-medical career), for the overall sample we find a pattern of stability over time. Only around 5 or 6 per cent of those reporting they did not consider this option at the beginning of training (at t) are willing to consider it in subsequent years. However, within this overall pattern of stability our results indicate that more women and non-white doctors consider working both outside the NHS and outside of their medical career at any point than is the case for male and white doctors.

Table 4.14. Changes over time in the willingness of junior doctors to working outside NHS at any point in their career (%)

		Stays "no" (at…)				
		t+1	*t+2*	*t+3*	*t+4*	*t+5*
"No" (at *t*)	All	70.73	66.09	65.44	62.33	61.60
	Male	68.07	65.98	64.86	60	62.07
	Female	71.58	66.12	65.63	63.03	61.46
	White	71.20	66.94	66.42	63.16	62.73
	Non-white	66.67	59.09	57.58	56	53.33
		Change to "yes, as part of my medical career" (at…)				
		t+1	*t+2*	*t+3*	*t+4*	*t+5*
"No" (at *t*)	All	23.78	28.22	29.19	33.02	32
	Male	27.73	30.93	32.43	36	37.93
	Female	22.52	27.36	28.13	32.12	30.21
	White	23.81	27.78	29.81	33.68	31.82
	Non-white	23.53	31.82	24.24	28	33.33
		Change to "yes, outside of my medical career" (at…)				
		t+1	*t+2*	*t+3*	*t+4*	*t+5*
"No" (at *t*)	All	5.49	5.69	5.37	4.65	6.40
	Male	4.20	3.09	2.70	4	
	Female	5.90	6.51	6.25	4.85	8.33
	White	4.99	5.28	3.77	3.16	5.45
	Non-white	9.80	9.09	18.18	16	13.33

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

In Table 4.15 below we report the changes in the sample size of the analysis shown in Table 4.14 both for the number of observations and the number of junior doctors involved in the transitions over time analysed. The sample size of junior doctors ranges between 93 per cent of the total sample interviewed for the patterns analysed between t and t+1 to 85 per cent for those between t and t+5.

Table 4.15. Sample size for the whole sample and all time periods considered: observations and individuals

Time period	N (observations)	N (doctors)
t to t+1	1,645	410
t to t+2	1,308	394
t to t+3	981	383
t to t+4	662	375
t to t+5	347	347

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

As with regards to the statistical significance of the patterns of stability and change analysed in Table 4.14, the results shown in Table 4.16 below indicate that all the transitions analysed are statistically significant. Besides, the Cramer's V estimated suggests a somewhat stronger association in the patterns found over time for male and non-white doctors.

Table 4.16. Statistical tests for the analysis shown in Table 4.14

	Pearson χ^2 (*)					Cramer's V				
	All	Male	Female	White	Non-White	All	Male	Female	White	Non-White
t to t+1	Yes	Yes	Yes	Yes	Yes	0.49	0.45	0.50	0.49	0.48
t to t+2	Yes	Yes	Yes	Yes	Yes	0.39	0.41	0.38	0.38	0.43
t to t+3	Yes	Yes	Yes	Yes	Yes	0.37	0.39	0.36	0.37	0.40
t to t+4	Yes	Yes	Yes	Yes	Yes	0.35	0.38	0.32	0.34	0.39
t to t+5	Yes	Yes	Yes	Yes	Yes	0.30	0.34	0.28	0.28	0.40

*Yes indicates Pearson χ^2 significant at least at 10 per cent

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.2 Career behaviour of junior doctors over time

The following section moves on to examine patterns of change over time in the *actual behavioural choices* of the doctors surveyed towards their careers, focusing on: career moves, including career breaks and overseas working; speciality moves; and career progression.

4.2.1 Career moves

Key Findings

- The vast majority (71 per cent) of the junior doctors remain working as doctors in the UK 10 years after beginning their training. Only 1 per cent has left medicine as a career; the remainder have taken a career break or gone overseas.
- Over one-fifth of the sample report having taken a career break.
- There is a strongly gendered pattern of taking a career break, with more women than men taking breaks (28 per cent compared to 10 per cent), and women taking longer breaks than men.
- Only about 5 per cent of the junior doctors spent any time working overseas.
- Working overseas was more common among male junior doctors than their female counterparts.
- At the end of the ten years, more women had left medicine than men, although the percentage for both was very small (1.5 per cent for women, 0.1 per cent for men).
- Career moves across years are more likely to be influenced by gender rather than ethnicity.

Since the year 2009, following the section on socio-demographic information, the questionnaire includes a key filter question asked to the whole sample of junior doctors about their career moves since the previous year. This filter question is then used to divert junior doctors to specific sections of the questionnaire according to their career moves. The career moves included in the filter question are:

- continued to work as doctors in the UK
- taken a career break
- worked overseas
- travelled overseas
- left medicine as a career

As Table 4.17 below indicates the majority of junior doctors report continuing to work as doctors in the UK (71 per cent), followed by those who have taken a career break (21 per cent).

Finally, those reporting to have worked overseas (5 per cent), travelled overseas (1 per cent) or have left medicine as a career (1 per cent) are a relatively smaller share of the sample as compared to the first two options. There are clear gender differences in career moves with more male doctors than females continuing to work as junior doctors in the UK, and more female ones taking career breaks across consecutive years. This clearly suggests a gender pattern of career choices most likely related with maternity leave. "Have taken a break from working for other reasons" leads to a section in the questionnaire where sick or study leave appear as options together with maternity or paternity leave. Most of the cases in that section of the questionnaire are cases of maternity leave. Also, more male doctors have worked overseas than female ones, whereas more female doctors have left medicine as a career than their male counterparts. Finally, with regards to differences by ethnicity these are much less clear than is the case for gender, which suggests that career moves across years are more likely influenced by the gender of junior doctors than by their ethnicity.

Table 4.17. *Please indicate which of the following you have done within the last year* (2009 to 2015 –all years) (%) n (total)=2,864

	Have continued to work as a doctor in the UK	Have worked overseas (either as a doctor or other occupation)	Have travelled overseas (other than for annual leave)	Have taken a break from working for other reasons	Have left medicine as a career
All	70.91	5.17	1.36	21.54	1.01
Male	81.74	7.01	1.28	9.87	0.10
Female	64.99	4.16	1.40	27.93	1.51
White	70.64	5.46	1.41	21.34	1.16
Non-white	72.31	3.20	1.14	23.11	0.23

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

The analysis below looking at changes across years will concentrate on the first two career moves – continued to work as a doctor in the UK and taken a career break – since they are the most dominant by a large margin. The analysis of changes over time will focus on the whole sample of junior doctors and explore differences by gender; sample sizes are too small to permit meaningful analysis by ethnicity.

From continuing to work as a doctor in the UK to...

In Table 4.18 we explore career moves for those junior doctors who in 2009 (time t) report to have stayed working as a doctor in the UK. The analysis looks at career moves between 2010 (t+1) and 2015 (t+6). At 2010 (t+1) around 90 per cent of those who have stayed working as doctors in the UK remain so, with only around 10 per cent reporting a career move. Of the latter, around 2 per cent report to have worked overseas, 1 per cent to have travelled overseas, 8 per cent to have taken a career break, and almost none have left medicine as a career. With

regards to gender differences between 2009 (t) and 2010 (t+1), again these are found in the higher percentage of female doctors who have taken a career break (12 per cent) as compared to their male counterparts (1.5 per cent).

Looking at career moves between 2009 (t) and 2011 (t+2) those who have changed from working as a doctor in the UK to any of the other options has increased to around 15 per cent. 3 per cent have gone to work overseas, 1 per cent have travelled overseas, 11 per cent have taken a career break and only 0.3 per cent of the whole sample of junior doctors have left medicine as a career. Gender differences are again exclusively concentrated in the move to take a career break: 17 per cent of female doctors take a career break between 2009 (t) and 2011 (t+2) whilst only 2 per cent of male doctors report the same career move.

Looking at career moves between 2009 (t) and 2012 (t+3) the share of doctors reporting a career move increases to 17 per cent of the whole sample with more than 3 per cent having worked overseas, 1 per cent travelling overseas, 12 per cent taking a career break, and 0.4 per cent leaving medicine as a career. Differences by gender are clear with regards to the move to take a career break (19 per cent of female doctors and only 2 per cent of male ones).

Career moves between 2009 (t) and 2013 (t+4) amount to 19 per cent of the junior doctors surveyed: 3 per cent moving to work overseas, less than 1 per cent travelling overseas, 14 per cent taking a break and less than 1 per cent leaving medicine as a career. Again, wide gender differences are found for the move to take a career break: 22.5 per cent of female doctors but only 2 per cent of male doctors.

Career moves between 2009 (t) and 2014 (t+5) amount to 22 per cent of the whole sample of doctors. 4 per cent report to move to work overseas, 17 per cent take a career break and 1 per cent left medicine as a career. Again, gender differences are concentrated in the move to work as a doctor in the UK and take a career break: almost 27 per cent of female doctors make this move whereas only 2 per cent of male ones do the same.

Finally, career moves between 2009 (t) and 2015 (t+6) result in 4 per cent of doctors moving between working as a doctor in the UK and going to work overseas, 18 per cent take a career break, and 1 per cent left medicine as a career. Again whereas only 2 per cent of male doctors take a career break, more than 28 per cent of female do so.

With regards to the statistical significance of the patterns of stability and change analysed in Table 4.18, the bottom of the table shows that all analysis reported is statistically significant. Also the Cramer's V indicates that the intensity of the associations found, in terms of stability and change over time, are quite strong even though there is not a clear pattern with regards to the impact of gender over time in the patterns of change and stability.

Table 4.18. Career moves across years focusing on the most relevant career options at time t (%)

		Stay "working as a doctor in the UK" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
Working as a doctor in the UK (at *t*)	All	89.54	84.59	82.84	81.11	78.09	77.06
	Male	95.89	94.12	94.77	95.76	95.37	94.54
	Female	85.21	78.24	74.96	71.59	67.15	65.68
		Change to "worked overseas (doctor or other occupation)" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	1.67	3.07	3.52	3.35	3.77	3.94
	Male	1.76	3.03	2.50	2.12	2.78	3.64
	Female	1.61	3.09	4.20	4.14	4.40	4.14
		Change to "travelled overseas (other than for annual leave)" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	1.02	1.07	0.90	0.60	0	0
	Male	0.88	1.07	0.68	0.30	0	0
	Female	1.11	1.07	1.05	0.79	0	0
		Change to "taken a break from working for other reasons" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	7.65	10.98	12.38	14.34	17.06	17.92
	Male	1.47	1.78	2.05	1.82	1.85	1.82
	Female	11.87	17.12	19.19	22.49	26.69	28.40
		Change to "have left medicine as a career" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	0.12	0.29	0.36	0.60	1.08	1.08
	Male	0	0	0	0	0	0
	Female	0.20	0.48	0.60	0.99	1.76	1.78
		Statistical tests*					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	Yes / 0.54	Yes / 0.46	Yes / 0.36	Yes / 0.29	Yes / 0.21	Yes / 0.17
	Male	Yes / 0.44	Yes / 0.35	Yes / 0.32	Yes / 0.34	Yes / 0.37	Yes / 0.24
	Female	Yes / 0.53	Yes / 0.45	Yes / 0.34	Yes / 0.25	Yes / 0.18	Yes / 0.18

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

From taking a career break to...

Table 4.19 reports the career moves of junior doctors who in 2009 (time t) report taking a career break. The analysis looks at career moves between 2010 (t+1) and 2015 (t+6).

Between 2009 (t) and 2010 (t+1) almost 39 per cent have returned to work as doctors in the UK from a career break, 2 per cent move to work overseas, less than 0.5 per cent move to travel overseas, and 1 per cent left medicine as a career, Overall 42 per cent of the sample of junior

doctors report a career move between being in a break in 2009 (t) and switching in 2010 (t+1). With regards to gender differences, results appear to be the mirror image of those in Table 4.18 above with: more male doctors (58 per cent) than females (37 per cent) returning to work as doctors between 2009 (t) and 2010 (t+1); more male doctors (10 per cent) than females (1 per cent) moving to work overseas; and more female doctors (1 per cent) than male (0 per cent) leaving medicine as a career after a break.

Between 2009 (t) and 2011 (t+2) 56 per cent of junior doctors who were in a career break return to work as doctors in the UK, 2 per cent move to work overseas, and almost 3 per cent left medicine as a career. Overall, 61 per cent of junior doctors who were in a career break in 2009 (t) experience a career move by 2011 (t+2). Putting it differently, 39 per cent of junior doctors surveyed remain in a career break after two years. With regards to gender differences, again more male doctors (94 per cent) have returned to work between 2009 (t) and 2011 (t+2) than females (52 per cent), and 3 per cent of female doctors leave medicine as a career from being in a break at 2009 (t), while no male doctors do the same.

Between 2009 (t) and 2012 (t+3) 81 per cent of the sample of junior doctors who were in a career break experience a career move. 72 per cent return to work as doctors in the UK (86 per cent of males and 68 per cent of females), 4 per cent move to work overseas (2 per cent males and 4 per cent of females), 3 per cent travel overseas (6 per cent males and 2 per cent females), and 2 per cent leave medicine as a career (1 per cent males and 2 per cent females).

Between 2009 (t) and 2013 (t+4) 91 per cent of the sample of junior doctors who were in a career break experience a move. 78 per cent return to work as doctors in the UK (90 per cent males and 75 per cent females), 3 per cent move to work overseas (6 per cent males and 2 per cent females), 1 per cent travel overseas (1 per cent for both male and female doctors), and 2 per cent left medicine as a career (all female doctors).

Between 2009 (t) and 2014 (t+5) 84 per cent of the sample who were in a career break have experienced a career move. 77 per cent have returned to work as doctors in the UK (89 per cent of males and 74 per cent of females), 5 per cent have moved to work overseas (7 per cent of males and 4 per cent of females), less than 1 per cent have travelled overseas, and another 1 per cent have left medicine as a career (again a move done exclusively by female doctors).

Finally, between 2009 (t) and 2015 (t+6) 85 per cent of the junior doctors who were in a career break have experienced a move. 76 per cent have returned to work as doctors in the UK (88 per cent for males and 72 for female doctors), 6 per cent have moved to work overseas (with no remarkable gender differences), 2 per cent have travelled overseas (3 per cent for males and 1 per cent for female doctors), and 1 per cent have left medicine as career (predominantly women). Almost 20 per cent of female junior doctors, however, are still in a career break after six years; this compares with only 3 per cent of males.

With regards to the statistical significance of the patterns of change and stability found in Table 4.19, all the transitions across time analysed are statistically significant. Also, the Cramer's V calculated indicate that the associations found are quite strong but again there is no clear gender pattern as was also the case for the analysis shown in Table 4.18.

Table 4.19. Career moves across years focusing on the most relevant career options at time t (%)

		Stay "have taken a break from working for other reason" (at …)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
"Have taken a break from working for other reason" (at *t*)	All	57.72	39.34	19.29	15.68	16.20	15.18
	Male	31.58	5.88	4.71	2.60	2.63	3.03
	Female	59.92	42.77	23.25	19.35	20.50	19.12
		Change to "working as a doctor in the UK" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	38.62	55.74	71.68	78.06	77.46	76.30
	Male	57.89	94.12	85.88	89.61	89.47	87.88
	Female	37	51.81	67.83	74.82	73.64	72.55
		Change to "worked overseas (either as a doctor or other occupation)" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	2.03	2.19	3.76	3.13	4.76	5.56
	Male	10.53	0	2.35	6.49	6.58	6.06
	Female	1.32	2.41	4.14	2.19	4.18	5.39
		Change to "travelled overseas (other than for annual leave)" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	0.41	0	3.01	1.14	0.63	1.85
	Male	0	0	5.88	1.30	1.32	3.03
	Female	0.44	0	2.23	1.09	0.42	1.47
		Change to "have left medicine as a career" (at…)					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	1.22	2.73	2.26	1.99	0.95	1.11
	Male	0	0	1.18	0	0	0
	Female	1.32	3.01	2.55	2.55	1.26	1.47
		Statistical tests*					
		t+1	*t+2*	*t+3*	*t+4*	*t+5*	*t+6*
	All	Yes / 0.54	Yes / 0.46	Yes / 0.36	Yes / 0.29	Yes / 0.21	Yes / 0.17
	Male	Yes / 0.44	Yes / 0.35	Yes / 0.32	Yes / 0.34	Yes / 0.37	Yes / 0.24
	Female	Yes / 0.53	Yes / 0.45	Yes / 0.34	Yes / 0.25	Yes / 0.18	Yes / 0.18

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

In Table 4.20 below we show the sample size of junior doctors with which the analyses presented in Tables 4.18 and 4.19 is done. With regards to the number of doctors involved, the sample size represents 89 per cent of the total sample of doctors surveyed in the study for the transitions between 2009 (t) and 2010 (t+1). This percentage goes down to 77 per cent for the career moves analysed between 2009 (t) and 2015 (t+6).

Table 4.20. Sample size for the whole sample and all time periods considered: observations and individuals

Time period	N (observations)	N (doctors)
t to t+1	2,073	392
t to t+2	1,718	385
t to t+3	1,616	391
t to t+4	1,265	382
t to t+5	925	380
t to t+6	342	342

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.2.2 Speciality moves

Key Findings

- More men than women choose hospital practice; more women than men choose General Practice.
- More non-white doctors choose hospital practice than white ones; more white doctors choose General Practice.
- Compared to their *intentions*, the junior doctors' *behaviour* is relatively stable overtime when it comes to area of speciality.
- General Practice is the most stable speciality: between 2011 and 2015 (the period these data are available for), there is virtually no movement out of General Practice.
- In the same period, about 5 per cent of those working in hospital practice moved into General Practice.
- Women doctors are more than twice as likely as their male counterparts to move from hospital to General Practice.

The question on speciality in the survey (available from 2011 to 2015 only) is a further filter from the previous one, and applies exclusively to those doctors surveyed who report in the current year of the survey to be working as a doctor in the UK. Because of this double filter the sample size drops, hindering our descriptive analysis over time. Moreover, we are unable to drill down to individual specialities - for example, within hospital practice, we cannot examine

surgery or A&E specifically. However, some of the results are worth highlighting, especially with regards to gender differences.

Table 4.21 shows the overall distribution of career choices across years. Clearly, the first choice of junior doctors for the whole sample is hospital practice followed by General Practice, and research and academic medicine. Interestingly, there are gender differences with more men than women choosing hospital practice and more women than men choosing General Practice. Also, even though it is a much less preferred option, male doctors seem to be more inclined towards pursuing a research or academic career than their female counterparts. As for ethnicity, more non-white doctors choose hospital practice than white ones, while more white doctors choose General Practice. Also, more non-white choose public health medicine than white. Given the very small sample size of non-white doctors and the reduced number of years where this question was included in the survey, we will not be able, however, to explore ethnic differences over time in the choice of current speciality.

Table 4.21. Current speciality (only for those working as a doctor in the UK) (%) (n total 1,628)

	Hospital practice	General Practice	Public health medicine	Community health	Research/Academic medicine	Other
All	55.47	35.26	0.80	0.12	4.18	4.18
Male	61.46	24.92	1.50	0	6.48	5.65
Female	51.95	41.33	0.39	0.19	2.83	3.31
White	54.55	36.93	0.15	0.15	4.08	4.15
Non-white	59.60	26.80	4.40	0	4.80	4.40

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

From hospital practice to...

Table 4.22 reports changes in career speciality over time focusing on those who move between stating that their choice was hospital practice in 2011 (t) and moving to any of the other options up to 2015 (t+4). Overall results suggest that changes in speciality are less common than the overall career moves analysed above. Thus, of those who chose hospital practice in 2011 (t), only around 10 per cent have experienced a switch in their choice of speciality in 2012 (t+1). 1.5 per cent have moved to General Practice, nearly 5 per cent have moved to research and academic medicine and almost 3 per cent to other speciality. Almost no doctors have opted for public or community health. The move to General Practice seems to be preferred by women whereas the move to research and academic medicine is mostly preferred by men.

Between 2011 (t) and 2013 (t+2), almost 19 per cent of the junior doctors who have opted for hospital practice change to other speciality. 3 per cent switched to General Practice (1 per cent

for male doctors and 4 per cent for female doctors) and 7 per cent to research and academic medicine (9 per cent for males and 6 per cent for females).

Between 2011 (t) and 2014 (t+3), around 23 per cent of the junior doctors who have opted for hospital practice switched their choice of speciality. 4 per cent moved to General Practice (2 per cent of males and 6 per cent of females), 1 per cent moved to public health medicine (a choice made exclusively by women), 8 per cent moved to research and academic medicine (9 per cent of males and 7 per cent of females), and 11 per cent moved to other unspecified specialities (14 per cent males and 10 per cent females).

Between 2011 (t) and 2015 (t+4) more than 25 per cent of the junior doctors who opted for hospital practice changed their speciality. Nearly 5 per cent moved to General Practice (3 per cent males and 6 per cent females), 1 per cent moved to public health medicine (a move taken exclusively by women), 8 per cent moved to research and academic medicine (10 per cent males and 7 per cent females), and 11 per cent moved to other speciality (14 per cent males and 10 per cent females).

The patterns of change and stability in the current speciality of junior doctors found are statistically significant as reported by the results of the statistical test shown at the bottom of the table. Besides, according to the Cramer's V results these patterns of association across time seem to be somewhat stronger for male doctors as compared to their female counterparts.

Table 4.22. Changes on current speciality across years focusing on the most relevant specialities at time t (%)

		Stay "hospital practice" (at…)			
"Hospital		*t+1*	*t+2*	*t+3*	*t+4*
practice" (at	All	90.81	81.37	75.29	74.25
t)	Male	89.01	80.45	75	73.61

Female	92.12	82.08	75.52	74.73
	Change to "General Practice" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	1.48	3.14	4.12	4.79
Male	0.71	1.36	2.08	2.78
Female	2.04	4.48	5.61	6.32
	Change to "Public health medicine" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0.15	0.59	1.18	1.20
Male	0	0	0	0
Female	0.25	1.03	2.04	2.11
	Change to "Community health" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0.15	0.39	0.29	0
Male	0	0	0	0
Female	0.25	0.69	0.51	0
	Change to "Research/Academic medicine" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	4.74	7.06	7.65	8.38
Male	6.38	8.64	9.03	9.72
Female	3.56	5.86	6.63	7.37
	Change to "Other" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	2.67	7.45	11.47	11.38
Male	3.90	9.55	13.89	13.89
Female	1.78	5.86	9.69	9.47
	Statistical tests*			
	t+1	*t+2*	*t+3*	*t+4*
All	Yes / 0.66	Yes / 0.59	Yes / 0.54	Yes / 0.55
Male	Yes / 0.70	Yes /0.65	Yes / 0.62	Yes / 0.62
Female	Yes / 0.58	Yes / 0.54	Yes / 0.56	Yes / 0.60

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

From General Practice to...

In Table 4.23 below we explore changes in speciality from General Practice between 2011 (t) and 2015 (t+4). Between 2011 (t) and 2012 (t+1) only around 2 per cent of junior doctors moved from General Practice to another speciality. 1 per cent moved to hospital practice (3 per cent males and 1 per cent females). There are almost no moves to any of the other speciality options. This seems to suggest that General Practice is a 'contained' or 'standalone' speciality.

Between 2011 (t) and 2013 (t+2) only around 6 per cent of those who opted for General Practice experienced a change of speciality. 2 per cent switched to hospital practice (5 per cent of males and 1 per cent of females) and 3 per cent to an unspecified other speciality (2 per cent of males and 3 per cent of females). There are almost no moves to public health, community health or research and academic medicine.

Between 2011 (t) and 2014 (t+3) again only around 6 per cent of those who were in General Practice moved to another speciality. Less than 2 per cent moved to hospital practice with the moves being done exclusively by men. The only remaining switch is to other unspecified speciality taken by 4 per cent (2 per cent males and 5 per cent females).

Finally, between 2011 (t) and 2015 (t+4), only 4 per cent of those who were in General Practice switched to another speciality. 1 per cent moved to hospital practice (only men did the move) and 3 per cent moved to another unspecified speciality (in this case only women did the move).

Finally, with regards to the statistical significance of the analysis shown in Table 4.23, the results of the test shown at the bottom of the table indicate that it is significant and, as it was the case, for the analysis reported in Table 4.22 above, the Cramer's V results suggest a stronger relationship for the patterns of stability and change in the career speciality of junior doctors over time than it is the case for female doctors.

Table 4.23. Changes on current speciality across years focusing on the most relevant specialities at time t (%)

		Stay "General Practice" (at…)			
		t+1	*t+2*	*t+3*	*t+4*
"General Practice" (at *t*)	All	97.14	94.26	94.36	96
	Male	95.24	91.67	92.16	96.15
	Female	97.74	95.23	95.14	95.95
		Change to "Hospital practice" (at…)			

	t+1	*t+2*	*t+3*	*t+4*
All	1.43	2.23	1.54	1
Male	2.68	4.76	5.88	3.85
Female	0.97	1.30	0	0
	Change to "Public health medicine" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0.24	0.32	0	0
Male	0.89	1.19	0	0
Female	0	0	0	0
	Change to "Community health" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0	0	0	0
Male	0	0	0	0
Female	0	0	0	0
	Change to "Research/Academic medicine" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0.24	0.32	0	0
Male	0	0	0	0
Female	0.32	0.43	0	0
	Change to "Other" (at…)			
	t+1	*t+2*	*t+3*	*t+4*
All	0.95	2.87	4.10	3
Male	0.89	2.38	1.96	0
Female	0.97	3.04	4.86	4.05
	Statistical tests*			
	t+1	*t+2*	*t+3*	*t+4*
All	Yes / 0.66	Yes / 0.59	Yes / 0.54	Yes / 0.55
Male	Yes / 0.70	Yes /0.65	Yes / 0.62	Yes / 0.62
Female	Yes / 0.58	Yes / 0.54	Yes / 0.56	Yes / 0.60

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Finally, Table 4.24 shows the sample size for all the time periods of the analysis reported in Tables 4.22 and 4.23. Focusing on the number of junior doctors involved they represent between 81 per cent of the total sample of junior doctors taking part in the study for the transition between 2011 (t) and 2012 (t+1) and 64 per cent for the analysis done between 2011 (t) and 2015 (t+4).

Table 4.24. Sample size for the whole sample and all time periods considered: observations and individuals

Time period	N (observations)	N (doctors)
t to t+1	1,171	355
t to t+2	870	342
t to t+3	566	328
t to t+4	281	281

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

4.2.3 Career progression

Key Findings

- Career progression is highly gendered, with men almost twice as likely as women to move from SAS doctors to Consultants in the 6 years for which we have these data.
- Very few junior doctors move out of a GP position.
- Women are more likely than men to move from SAS to GP positions.

Those who reported to have stayed working as doctors in the UK each year of the survey between 2010 and 2015 were asked about their current grade. Looking at the responses to this question over the available years it is possible to analyse the career progression of the junior doctors taking part in the study.

Table 4.25 below shows the different grades considered. Confirming our analysis above there are more women than men among GPs, and more white than non-white GPs as well. As for consultants, again there are more men and white doctors. With regards to the SAS doctor category, there are no clear gender differences for this group but there are slightly more non-white doctors than white ones. Among those in a research / academic post there are more male and non-white doctors than women or white doctors. The analysis below will allow us to investigate patterns over time in order to identify any meaningful gender differences in career progression; as before, sample sizes are too small to allow analysis by ethnicity. We shall focus on the most two common career options as reported in Table 4.25: GP and SAS doctors.

Table 4.25. Current grade (only for those working as a doctor in the UK) (n total 1,934) (%)

Grade	All	Male	Female	White	Non-white
GP	17.22	14.11	19.08	18.13	12.75
Consultant	1.29	1.80	0.99	1.36	0.98
SAS doctors	70.22	69.7	70.52	69.54	73.53
Non-standard research or academic post	3.62	5.39	2.56	3.45	4.58
Other	7.66	8.996	6.86	7.53	8.17

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Career progression of GPs

In Table 4.26 we look at changes in the current grade of GPs in 2010 (t) over a time span of three years[3]. As GPs seem to be a 'contained' or 'standalone' career speciality not surprisingly they move to other career options over time instead of to occupations which are hospital based. Overall two main conclusions can be drawn from the analysis shown in the table: (1) very few junior doctors move over time from a GP position, and (2) there are no clear gender differences among those who decide to leave a GP post over time to other occupations.

[3] For GPs we are only able to look at patterns of change and stability over three years, since the length of training for GPs is shorter than that of hospital specialities.

Table 4.26. Changes on current grade across years focusing on the most relevant grades at time t (%)

		At t+1	
		GP	Other
GP (at *t)*	All	98.97	1.03
	Male	98.48	1.52
	Female	99.22	0.78
		At t+2	
	All	98.29	1.71
	Male	97.50	2.50
	Female	98.70	1.30
		At t+3	
	All	97.83	2.17
	Male	100	0
	Female	96.67	3.33

	Statistical tests*		
	t+1	t+2	t+3
All	Yes / 0.44	Yes / 0.29	Yes / 0.22
Male	Yes / 0.48	Yes / 0.36	Yes / 0.26
Female	Yes / 0.42	Yes / 0.27	Yes / 0.22

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Career progression of SAS doctors

The analysis presented in Table 4.27 below focuses on the career progression of SAS doctors, that is, doctors working in hospitals who may have completed their hospital training or are still in training (we cannot know with the data available whether training has been completed), but in both cases are not consultants. Indeed, move to a consultant position is not a development ought by all SAS doctors. With the information available in the panel we can look at their career progression for over a period of up to six years, that is, between 2010 (t) and 2015 (t+5). The analysis provides relevant insights for the overall sample of junior doctors as well as it highlighting notable gender differences.

Between 2010 (t) and 2011 (t+1) nearly 77 per cent of the SAS doctors do not change their hospital occupation. The remaining 23 per cent, however, do change occupation. More than 9 per cent change to a GP occupation, leaving their hospital career SAS doctors and GPs have different training tracks, and a move between the two would require some re-training, a factor that we would expect to act as a disincentive to move. For this reason we would like to add a note of caution with regards to the reporting of such a move. A further almost 8 per cent change to an unspecified other occupation. Over 3 per cent switch to pursue a research career in medicine, and slightly over 1 per cent move to a consultant grade. The most notable differences by gender are: (1) more men than women move to a consultant position; (2) whereas more women than men shift to a GP position; and (3) more women than men shift to research roles from being SAS doctors in hospital.

Career progression between 2010 (t) and 2012 (t+2) is along the lines found for the first time transition, but with more clear gendered patterns. More women than men shift between SAS posts to GP positions and more men than women move to a research-based career. The percentage of SAS doctors becoming consultants remains slightly over 1 per cent, in this case, with no clear gender differences.

Between 2010 (t) and 2013 (t+3) career progression patterns resemble those already identified. The longer the time span considered the more junior doctors decide to switch between a hospital occupation to become GPs. This career move is particularly led by women. As for male doctors, when they move occupations over time they are more likely to choose a research post than are women. As for those who move to a consultant role, there are more men than

women: although percentages are still small, there are almost twice the number of men than women who become consultants between 2010 (t) and 2013 (t+3).

The highlights for the career progression patterns between 2010 (t) and 2014 (t+4) and between 2010 (t) and 2015 (t+5) are very similar to those already commented upon. Within an overall pattern of more career moves as the time elapses, increasingly more female doctors than male doctors move from their SAS occupation to GP positions. More male doctors than females leave their SAS hospital positions to pursue a research role in medicine. And, finally, for those doctors pursuing progression to consultant positions in hospital, the percentage of male doctors that has moved to consultant positions after six years of being SAS doctors is almost double that of women (13 per cent and 7 per cent, respectively).

As for the statistical significance of the patterns of stability and change found, these are all statistically significant as reported by the χ^2 test results shown at the bottom of the table. As expected, since male doctors change their occupations more than women over time, the Cramer's Vs calculated for them is bigger but for both men and women, nevertheless, these are quite large.

Table 4.27. Changes on current grade across years focusing on the most relevant grades at time t (%)

		At t+1				
		GP	Consultant	SAS doctors	Non-standard research or academic post	Other
SAS doctors (at *t*)	All	9.46	1.37	76.68	3.51	7.61
	Male	6.85	2.03	75.89	5.84	7.87.
	Female	11.09	0.95	77.18	2.06	7.45
		At t+2				
	All	20.80	1.53	60.87	5.64	9.05
	Male	16.11	1.22	61.09	7.90	10.64
	Female	23.75	1.72	60.73	4.21	8.04
		At t+3				
	All	27.62	3.26	50.57	6.52	9.92
	Male	20.71	4.29	50.71	9.29	12.51
	Female	32.16	2.58	50.47	4.69	8.21
		At t+4				
	All	34.48	4.44	48.19	5.04	6.25
	Male	26.67	6.15	50.77	7.18	7.18
	Female	39.53	3.32	46.51	3.65	5.64
		At t+5				
	All	32.17	9.69	46.51	3.88	5.82
	Male	24.49	13.27	47.96	7.14	5.10
	Female	36.88	7.50	45.63	1.88	6.25

	Statistical tests*				
	t+1	t+2	t+3	t+4	t+5
All	Yes / 0.44	Yes / 0.29	Yes / 0.22	Yes / 0.17	Yes / 0.32
Male	Yes / 0.48	Yes / 0.36	Yes / 0.26	Yes / 0.18	Yes / 0.47
Female	Yes / 0.42	Yes / 0.27	Yes / 0.22	Yes / 0.20	Yes / 0.30

*Yes indicates Pearson χ^2 significant at least at 10%. The number in each cell is the Cramer's V.

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Finally, the analyses reported in Tables 4.26 and 4.27 have involved a varying number of junior doctors from around a maximum of 83 per cent of the total sample of junior doctors interviewed in the panel when looking at career progression patterns between 2010 (t) and 2011 (t+1) to a minimum of 63 per cent of the total sample of doctors when looking at career progression patterns between 2010 (t) and 2015 (t+5).

Table 4.28. Sample size for the whole sample and all time periods considered: observations and individuals

Time period	N (observations)	N (doctors)
t to t+1	1,410	367
t to t+2	1,108	352
t to t+3	829	345
t to t+4	549	326
t to t+5	276	276

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

5. FINDINGS: MULTIVARIATE ANALYSIS

5.1 Multivariate analysis approach

Panel data are required to accurately assess the impact of socio-demographic and attitudinal factors, as well as the overall policy context affecting the medical profession at a particular point in time, on career decisions taken by junior doctors over time. For our estimations we use a random effects probit procedure (see Appendix 5 for further details). In the first analysis presented in Table 5.1 below we model the decision to have a career move from working as a doctor in the UK at time t, to either work overseas at t+1, travel overseas at t+1, or take career break at t+1. These career moves are analysed in three random effects probit models shown in Table 5.1 as function of a series of individual and family characteristics of the junior doctors surveyed, their attitudes towards their career and the medical profession, and the time trend of the panel. All these measure at t so as to capture the impact of these factors as push factors or drivers to trigger their career move decisions between t and t+1.

Using a random effects probit approach allows us to benefit from the panel nature of the data by controlling for unobserved factors, that is, elements that were not included in the yearly questionnaires of our panel survey and that may affect the career moves we are interested in. Usual examples of these unobserved factors when working with panel data and researching work-related matters are, for instance, how productive an individual is at work. Substantively, we are interested in investigating gender differences in the career moves of junior doctors over time and how these may relate with the different attitudes of female and male doctors towards their profession, as well as the unequal impact that their personal and family circumstances may have on their actual career moves. For this reason, all analyses are presented separately for male and female doctors.[4]

As explained in the analysis shown in Table 5.1 we present three models with three complementary dependent variables in which value 0 corresponds to respondents working as doctors in the UK at t. In Model 1 value 1 of the dependent variable corresponds to moving to work overseas at t+1; in Model 2 value 1 corresponds to travel overseas at t+1; and, finally, in Model 3, value 1 corresponds to taking a career break at t+1.

[4] Sample sizes are too small to allow a similar exercise based on ethnicity.

As for the explanatory variables included in the estimation of the three models, these are the following (all measured at time t):

Number of children: this is a categorical variable for the number of children of the junior doctor respondent with "none" for those with no child, "one" for those with one child, "two" for those with two children, and "three or more" for those with three or more children.[5]

Ultimate career goal: is a categorical variable that gathers the responses of junior doctors at t with regards to their most desired career goals. These goals refer to standard career options such as consultant, SAS doctor, general practitioner, academic post, or undecided and other options.

Plans of working outside the UK: given that one of the career moves analysed involves junior doctors who report to have moved to working outside the UK at t+1, this attitudinal variable is important since it may anticipate such a decision. It is a categorical variable with three different options: no present plans, yes temporarily, and, yes permanently.

Non-white: is a dummy variable for the ethnic background of the junior doctors interviewed. Value 0 for white doctors and value 1 for non-white doctors.

Age and *age squared*: are two continuous variables for the age of the junior doctors. The squared specification allows us to investigate a non-linear effect of age on the actual career moves of the respondents between t and t+1.

Residence type: is a categorical variable for the type of residence where the junior doctors interviewed declared to live. The different options are: tenant, home owner, other, living with

[5] While we aimed to investigate the impact of changes in the number of children on career moves, the number of junior doctors reporting changes in the number of children is very small. For instance, looking at changes in the number of children between consecutive years, it turns out that only 174 junior doctors out of 2,551 who had no children in a given year reported to have had one a year later. This amounts only to 5 per cent of total cases in the variable for number of children across the ten years of the study. Taking into account also the fact that we cannot use all waves in the multivariate analysis due to missing information, we had to rule out the option of investigating the impact of changes in the number of children on career moves and opt instead for the more static approach described in the text.

parents, and living in hospital accommodation.

Either parent is a doctor: this is a family background categorical variable with four options: neither parents were doctors, father only, mother only, or both parents.

Age decided to become a doctor: this is a continuous variable recording the self-declared age at which the junior doctors interviewed decided they wanted to study medicine to become doctors.

Type of secondary school attended: this is a family background categorical variable with the following categories: independent boarding, independent day, grammar, comprehensive, overseas, and other

Time trend: this is a series of dummy variables for the years of the different waves of the panel used in the analyses.

Finally, in order to ease the interpretation of the key results of the multivariate analyses we use postestimation methods that allow us to predict the odds for outcomes analysed (change to work overseas, change to travel overseas, and change to take a career break) for a representative doctor. For our definition of representativeness we take the mean and modal sample values of the explanatory variables used in our analyses for female doctors, and we impute those to the male respondents. This procedure allows us to investigate the impact of gender in the odds of making career moves between t and t+1 for two comparable female and male doctors in all their observable characteristics. Results of this postestimation analysis are shown in Figures 5.1, 5.2 and 5.3 below.[6]

[6] Our representative junior doctor has the following characteristics: one child (even though in the sample the most common value is no child we have opted for one child in order to investigate the impact of children on career moves), no present plans to work outside the UK, white background, 30 years old, home owner, neither of the parents are/were doctors, decided to become doctors at age 14, and attended a comprehensive secondary school.

5.2 Results[7]

Key Findings

- The number of children is a strong predictor of female junior doctors' career behaviour in terms of working overseas, taking a career break and speciality move.
- The number of children has no impact on male doctors' career behaviour.
- A representative male doctor with the same observable characteristics as his female counterpart is significantly less likely to take a career break.
- Non-white male doctors are more likely to take a career break than their white counterparts.
- Intentions to work overseas are very strong predictors of actual career choices of working or travelling overseas. This association is gendered, being twice as strong for male doctors than for their female counterparts.
- Male doctors with home ownership are less likely to travel overseas compared to tenants.
- A representative male doctor with the same observable characteristics as his female counterpart is significantly more likely to work overseas.

5.2.1 Explaining career moves

Moving overseas

The first two models in Table 5.1 below show the results for the male and female junior doctors who report to have moved overseas between t and t+1. Female doctor are less likely to move overseas if they have children. For their male counterparts even though the estimated coefficients are also negative none of them are statistically significant. Therefore, family responsibilities seem to have a clear gendered impact which only affects women's career moves, especially when they imply geographical moves. As expected, the effect is more negative for female doctors as the number of children increases.

Likewise, none of the ultimate career goals of male junior doctors at t appear to have an impact in

[7] The empty cells for some of the categories of the explanatory variables are due to a lack of observations for those categories in the estimated models.

their decision to move for work overseas at t+1. Conversely, for female doctors both when their ultimate career goals are being a GP or an academic, as compared to being consultant, there is a positive association with the likelihood of moving to work overseas at t+1. The rationale for this may be that both goals are associated with more stable career where it may be easier to make the arrangements for temporal moves abroad.

As expected both having plans of working outside the UK either temporarily or permanently are positively associated with the likelihood of actually going to work abroad at t+1 (as compared to not having any plans). Interestingly, the impact of the motivations to work abroad at t on the actual career move at t+1 is stronger for male doctors than for female ones both for having plans to work temporarily or permanently.

Non-white male doctors are less likely to move to work overseas at t+1 than white ones. The relationship is also negative for female non-white doctors but in this case this is not statistically significant.

Age is not associated for either male or female doctors with moving to work overseas. Likewise, residence type has no impact in moving to work overseas for male doctors. Yet, for female doctors living in hospital accommodation (as compared to being a tenant) is positively associated with moving to work overseas at t+1.

Having parents with a medical background has no impact in deciding to work overseas. As for the type of school attended, our results indicate that female doctors who attended an independent school are more likely to work overseas. We find no impact of the secondary school background on male doctors.

Finally, the estimated coefficients for the year dummies show clear gender differences. We find no effect of any time trend impact on working overseas for male doctors but for female ones our results indicate that female doctors were more likely to move and work overseas in 2014 and 2015 as compared to the reference year 2009.

Travelling overseas

In Models 3 and 4 of Table 5.1 we report the results for travelling overseas at t+1. Perhaps not surprisingly all female doctors reporting that move have no children, which explains the empty cells. For male doctors again having children is not statistically associated with travelling overseas.

With regards to the ultimate career goals of junior doctors, our results indicate that male doctors who are undecided are more likely to travel overseas at t+1 as compared to those whose ultimate goal is to be a consultant. For female doctors having as ultimate career goals at t to be a SAS doctor, GP or academic are all positively associated with travelling overseas at t+1.

As before, having the intention to work overseas either temporarily or permanently at t are both associated with a higher likelihood to travel overseas at t+1. These higher odds are again stronger for male doctors than for their female counterparts.

Age is statistically associated with the likelihood to travel overseas. Older doctors are more likely to travel overseas but these higher odds seem to weaken with age as shown by the negative coefficient of the squared specification of the age variable. For female doctors we find no effect for age.

Male doctors who are home owners at t are less likely to travel overseas at t+1 as compared to tenants. Again, we find no effect of tenancy status for female doctors. Having parents with a medical background, again, is not associated with this career move either for male or female doctors.

Age at which male doctors decided to study medicine is positively associated with a higher likelihood to travel overseas but has no effect for female doctors. Having attended an independent secondary day school is both for male and female doctors negatively associated with the likelihood to travel overseas. Finally, none of the year dummies are statistically associated with this career move at t+1.

Taking a career break

In Models 5 and 6 of Table 5.1 we report the results for moving to take a career break at t+1. The number of children is a strong predictor of this career move for female doctors but it is not for their male counterparts.

As for the ultimate career goals of junior doctors at t we find no effect on the decision to take a career break at t+1 for male doctors but for female doctors being undecided is positively associated with this career move at t+1.

Having the intention to work temporarily outside the UK at t is associated with a higher likelihood to take a career break at t+1 both for male and female doctors but again the effect appears to be stronger for male doctors.

Non-white male doctors are more likely to take a career break than their white counterparts. For female doctors ethnic background has no effect on the decision to take a career break. As for age it does not have an effect on taking a career break for either male or female doctors.

With regards to tenancy status our results suggest that male doctors who are home owners (as compared to tenants) at t are less likely to take a career break at t+1. For female doctors tenancy status has no effect on taking a career break.

Having parents with a medical background has no effect on the decision to take a career break at t+1 for both male and female doctors. Also we find no association for the age at which both male and female doctors decided to become doctors. As for the type of secondary school attended we find also no effect for both men and women on taking a career break.

Finally, the year dummies suggest a different impact of time for male and female doctors on the decision to take a career break. There is no effect of time for male doctors but the effect is statistically significant and negative for female doctors in the years 2013, 2014, and 2015, as compared to reference year 2009. For those three years the likelihood to take a career break is higher than in 2009.

Table 5.1. Determinants of career moves of junior doctors from working as a doctor in the UK at t: Random effects probit models

	Change to work overseas (t to t+1)		Change to travel overseas (t to t+1)		Change to take a career break (t to t+1)	
	(1)	(2)	(3)	(4)	(5)	(6)
Variables (at t)	Males	Females	Males	Females	Males	Females
Number of children (ref: no child)						
One	-0.427	-1.001**	0.394		0.239	2.391***
	(0.565)	(0.499)	(0.956)		(0.352)	(0.195)
Two	-0.871	-1.686**	0.885		0.533	2.472***
	(0.843)	(0.709)	(1.222)		(0.437)	(0.234)
Three or more						3.114***
						(0.447)
Ultimate career goal (ref: consultant)						
SAS doctors	-0.024	-0.265	0.052	0.528*	-0.636	-0.032
	(0.637)	(0.387)	(0.812)	(0.299)	(0.590)	(0.167)
GP	-0.012	0.897**		1.149***	0.531	0.286
	(0.655)	(0.455)		(0.360)	(0.373)	(0.238)
Academic	-1.263	0.548*	0.792	0.871***	0.201	0.252
	(0.782)	(0.311)	(0.987)	(0.334)	(0.381)	(0.180)
Undecided / Other	0.476	0.056	2.899***	0.525	-0.476	0.462*
	(0.634)	(0.464)	(1.074)	(0.418)	(0.597)	(0.248)
Plans of working outside the UK (ref: no present plans)						
Yes, temporarily	2.060***	1.542***	2.567**	0.432*	0.604**	0.329**
	(0.603)	(0.282)	(1.161)	(0.240)	(0.280)	(0.143)
Yes, permanently	4.530***	2.629***	5.029***	1.854***	0.813	0.412
	(0.771)	(0.380)	(1.472)	(0.364)	(0.645)	(0.279)
Non-white	-1.753*	-0.208		0.103	0.599*	0.124
	(0.975)	(0.376)		(0.304)	(0.364)	(0.184)
Age	2.104	2.470	30.877**	1.067	0.649	0.201
	(1.768)	(1.990)	(14.695)	(1.506)	(1.878)	(0.342)
Age (squared)	-0.035	-0.042	-0.530**	-0.018	-0.013	-0.003
	(0.028)	(0.033)	(0.248)	(0.024)	(0.031)	(0.005)
Residence type (ref: tenant)						
Home owner	-0.638	-0.247	-1.428*	0.265	-0.568**	0.106
	(0.426)	(0.244)	(0.838)	(0.263)	(0.269)	(0.178)
Other	0.528	0.319	-0.029	0.169	-0.842	0.154
	(0.543)	(0.341)	(0.798)	(0.430)	(0.549)	(0.272)

Living with parents	-	-0.245				0.002
		(0.861)				(0.725)
Hospital accommodation	-	1.782*				1.128
		(1.067)				(1.209)
Either parents are doctors (ref: neither)						
Father only	0.803	-0.279	1.992	-0.099	0.412	0.290
	(0.659)	(0.411)	(1.222)	(0.392)	(0.350)	(0.214)
Mother only		0.477	1.176	-0.495	0.213	-0.071
		(0.572)	(1.241)	(0.682)	(0.546)	(0.433)
Both	0.207	-0.566	1.056	-0.306		0.173
	(0.852)	(0.630)	(0.828)	(0.465)		(0.306)
Age decided to become a doctor	0.072	0.057	0.408**	0.025	0.023	0.016
	(0.062)	(0.036)	(0.186)	(0.028)	(0.035)	(0.016)
Type of secondary school attended (ref: independent boarding)						
Independent day	-0.649	1.113**	-2.040*	-0.810*	0.417	-0.270
	(0.925)	(0.535)	(1.090)	(0.460)	(0.630)	(0.277)
Grammar	0.135	0.069		-0.279	0.952	-0.464
	(0.896)	(0.584)		(0.389)	(0.646)	(0.300)
Comprehensive	0.803	0.471	0.185	-0.001	1.082	-0.368
	(0.893)	(0.532)	(0.891)	(0.353)	(0.680)	(0.282)
Overseas		0.498		-0.575		0.147
		(0.667)		(0.530)		(0.389)
Other		0.359				-0.170
		(0.970)				(0.459)
Year (ref: 2009)						
2010	0.354	-0.394	0.107	-0.244	0.132	-0.103
	(0.534)	(0.352)	(0.694)	(0.302)	(0.349)	(0.211)
2011	0.812	0.079	-1.184	-0.614	-0.625	-0.218
	(0.509)	(0.321)	(1.076)	(0.377)	(0.463)	(0.216)
2012	0.443	0.495	0.289	0.039	-0.319	-0.307
	(0.517)	(0.312)	(0.693)	(0.305)	(0.427)	(0.222)
2013	0.031	0.494	0.118	-0.334	-0.440	-0.607***
	(0.586)	(0.338)	(0.748)	(0.383)	(0.470)	(0.232)
2014	0.295	0.988***	-0.551	-0.248	0.156	-0.889***
	(0.576)	(0.329)	(0.898)	(0.411)	(0.389)	(0.241)
2015	0.551	0.752**		-0.981	-0.322	-0.744***
	(0.599)	(0.338)		(0.650)	(0.485)	(0.237)

Constant	-35.031 (28.582)	-40.497 (29.973)	-458.687** (219.075)	-18.876 (23.260)	-11.146 (28.432)	-5.179 (5.530)
Number of observations	769	1,221	410	881	689	1,412
Number of doctors	134	249	87	214	123	248
χ^2	43.21	77.29	19.70	42.51	23.750	189.804
Prob>χ^2	0.024	0.000	0.714	0.029	0.590	0.000

Standard errors in parentheses
Significant at: *** p<0.01, ** p<0.05, * p<0.1

Source: BMA Junior Doctors Cohort Panel. Authors' own calculations.

5.2.2 Impact of gender on career moves

With the next three figures we aim to show the likelihood of the career moves at t+1 analysed in Table 5.1 for a representative junior doctor with the set of observed characteristics outlined in Footnote 5. The figures provide a substantive and clear illustration of the gender differences in the career moves of male and female doctors. In addition, they also show whether those gender differences are statistically significant as reported by the 95 per cent confidence interval bars.

Moving overseas

In Figure 5.1 we report the probability (in a scale from 0 to 100 per cent) for our representative junior doctor of moving from working as a doctor in the UK to working overseas. Male doctors are much more likely to work overseas than female ones. Whereas the likelihood is above 8 per cent for male doctors, it is slightly below 6 per cent for female doctors. The 2 per cent difference is statistically significant. Needless to say the difference to 100 per cent corresponds to the probability of staying working as doctors in the UK at t+1 which is the most common option for the junior doctors interviewed (around 80 per cent of the sample stays working as doctors in the UK across years).

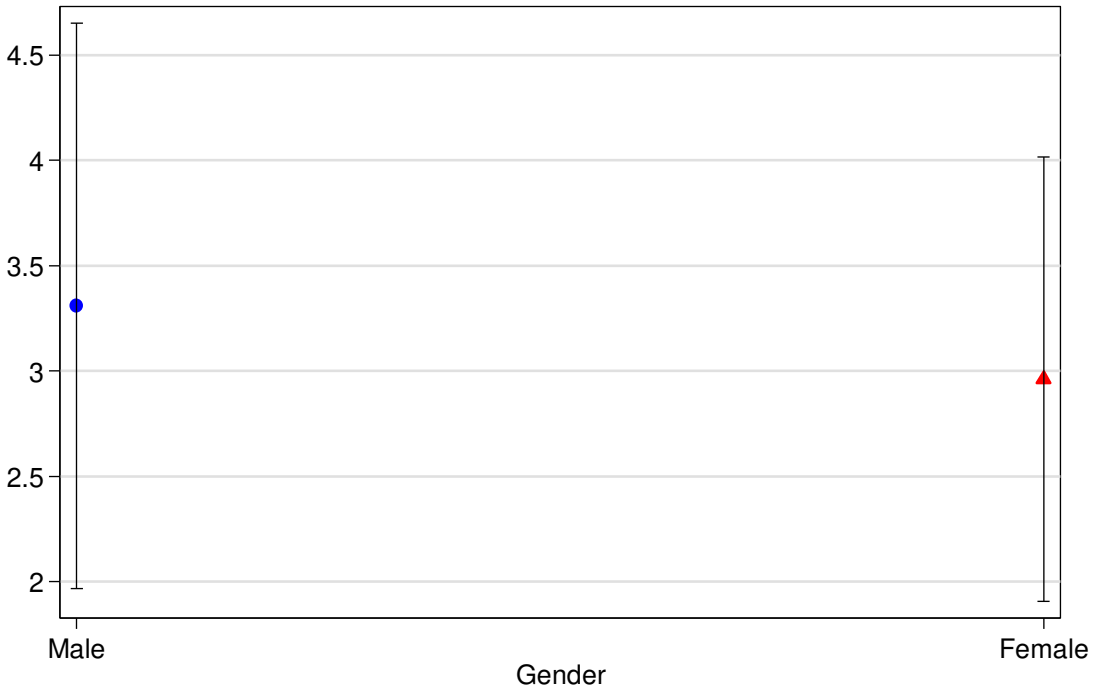
Figure 5.1. Probability of changing from working as a doctor in the UK to working overseas (between t and t+1) (%) [capped lines indicate 95 per cent confidence intervals]

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Travelling overseas

In Figure 5.2 we show the probability of travelling overseas at t+1 for our representative junior doctors. Those are 3.4 per cent for male doctors and around 3 per cent for female doctors. The 0.4 per cent difference is not statistically significant at the 95 per cent confidence level. Indeed, the wide confidence intervals estimated overlap; this suggests that the likelihood of travelling overseas are the same for male and female doctors.

Figure 5.2. Probability of changing from working as a doctor in the UK to travelling overseas (between t and t+1) (%) [capped lines indicate 95 per cent confidence intervals]



Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Taking a career break

Finally, in Figure 5.3 we report the probability of taking a career break between t and t+1 for our representative junior doctor. In this case the gender difference is apparent and striking. Female doctors have an 18 per cent probability of taking a career break between t and t+1 whereas this is only 4 per cent for male doctors. As reported by the 95 per cent confidence intervals, the 14 per cent difference is statistically significant, which can be interpreted as indicative that the main reason to take a career break is the different childcare responsibilities of men and women.

Figure 5.3. Probability of changing from working as a doctor in the UK to taking a break from

work (between t and t+1) (%) [capped lines indicate 95 per cent confidence intervals]

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

5.2.3 Explaining speciality moves

The analysis presented in Table 5.2 focuses on changes of specialism of male and female doctors between t and t+1. We focus on the change that comprises the largest number of moves for our sample of junior doctors which is between SAS doctors to GP, although it is important to bear in mind the note of caution highlighted in Section 4 in relation to this finding. We find that the number of children is a strong predictor for changing between being a SAS doctor to become a GP between t and t+1 only for female doctors but not for their male counterparts.

Having becoming a SAS doctor as the ultimate career goal for male doctors (as compared to consultant) has a positive impact on the likelihood to become GP at t+1. For females all alternative career goals to the reference category, consultant, are associated with higher odds of changing to a GP post from being a SAS doctor.

We do not find any significant effect for either male or female doctors of having plans to work outside the UK at any point in their careers on the likelihood to move from a SAS occupation to GP. With regards to ethnic background our results suggest that non-white male doctors are more likely to change to GP than white ones. We find no effect of ethnic background for female doctors.

Age does not appear to have any significant effect for either male or female doctors in the decision

to shift from a SAS doctor to become GP. Likewise, we do not find any effect of residence type. Nor do we find any effect either for our sample of doctors on whether they have parents with a medical background. As with regards to the age at which junior doctors decided to study medicine, there is no significant effect for males but it is significant and negative for females suggesting that the older they decided to study medicine the less likely is to shift between a SAS doctor occupation to GP. The type of secondary school attended as a proxy for family background has no effect on the change of occupation analysed for either male or female doctors.

Finally, the time trend of the panel provides some meaningful results. It appears that male doctors in 2012 (as compared to the reference year 2015) were less likely to shift between SAS doctor occupations and a GP role. For female doctors the impact of time is even more remarkable: in the years 2012, 2013 and 2014 women were less likely to change from a SAS doctor occupation to GP as compared to the reference year 2015.

Table 5.2. Determinants of changing specialism from SAS doctors at t to GP at t+1: Random effects probit models

	Change to GP at t+1	
	(1)	(2)
Variables at t	Males	Females
Number of children (ref: no child)		
One	0.176	0.225
	(0.877)	(0.619)
Two	1.653	2.055**
	(1.238)	(0.848)
Three or more	2.781	1.726
	(2.310)	(1.761)
Ultimate career goal (ref: consultant)		
SAS doctors	6.220**	9.316***
	(3.019)	(2.591)
GP	1.014	5.576***
	(1.989)	(2.117)
Academic	3.884	8.410***
	(2.669)	(2.569)
Undecided / Other		6.648***
		(2.200)
Plans of working outside the UK (ref: no present plans)		
Yes, temporarily	-0.725	-0.801
	(1.058)	(0.716)
Yes, permanently	3.095	1.749
	(4.184)	(1.613)
Non-white	4.538*	0.246
	(2.369)	(0.862)
Age	0.869	-1.731
	(1.253)	(1.630)
Age (squared)	-0.013	0.022
	(0.017)	(0.025)
Residence type (ref: tenant)		
Home owner	3.589	0.526
	(2.473)	(0.746)

Other	4.261	0.423
	(3.212)	(0.971)
Living with parents	-0.479	-1.489
	(4.460)	(1.725)
Hospital accommodation		3.045
		(2.348)
Either parents are doctors (ref: neither)		
Father only	-3.652	-1.613
	(2.425)	(1.062)
Mother only		-3.378
		(2.239)
Both	2.098	1.128
	(1.877)	(1.436)
Age decided to become a doctor	0.198	-0.131*
	(0.140)	(0.076)
Type of secondary school attended (ref: independent boarding)		
Independent day	-0.567	1.783
	(2.350)	(1.426)
Grammar	-1.535	1.914
	(2.513)	(1.470)
Comprehensive	-1.245	1.775
	(2.295)	(1.428)
Overseas		0.592
		(2.178)
Other		3.250
		(2.369)
Year (ref: 2015)		
2010	-	
2011		
2012	-2.760*	-4.920***
	(1.493)	(1.543)
2013	-0.718	-2.353***
	(0.955)	(0.894)
2014	-0.429	-1.182*
	(0.874)	(0.612)
Constant	-27.643	26.279
	(24.235)	(25.995)
Number of observations	147	632
Number of doctors	58	230
χ^2	11.82	24.28
Prob>χ^2	0.99	0.76

Standard errors in parentheses
Significant at: *** p<0.01, ** p<0.05, * p<0.1

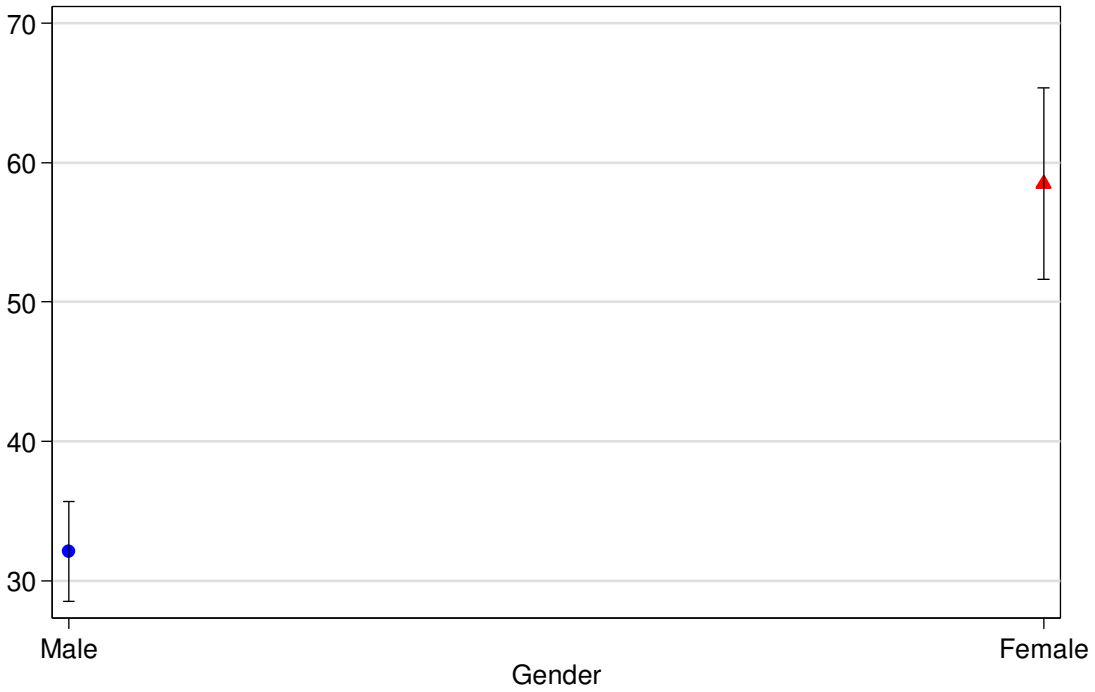
Source: BMA Junior Doctors Cohort Panel. Authors' own calculations.

5.2.4 Impact of gender on speciality moves

Figure 5.4 below reports the probability of changing between a SAS hospital occupation to a GP role between t and t+1 for the same representative male and female doctor as defined in Footnote 6 and used already for the postestimation Figures 5.1 to 5.3 based on the results reported in Table 5.1.

In line with the results in Table 5.2 it turns out that female doctors are much more likely to change from a SAS occupation to become GP between t and t+1. The nearly 30 per cent gap is statistically significant. This large difference is likely due to the differential impact identified in our multivariate analysis for the number of children on this occupation move.

Figure 5.4. Probability of changing from being a SAS doctor to GP (between t and t+1) (%) [capped lines indicate 95 per cent confidence intervals]



Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

6. DISCUSSION

Over the duration of the longitudinal study (2006-15) we could reasonably hypothesise that a range of external policy factors would shape the responses of respondents in particular years. Such policy influences could be viewed as those operating in advance (whereby changes on the horizon serve to prime respondents' responses), and those operating in arrears (where effects appear in the period following the implementation of a change). In this section, we situate the findings reported in the previous sections in this wider social policy context, focusing on two areas in particular: workforce and morale (including NHS funding, pay, working hours, staffing, recruitment), and the gendered characteristics of junior doctors' career trajectories. We juxtapose external policy drivers (within health policy, immigration and family policy) and their hypothesised impacts, with the evidence from our longitudinal analysis of the cohort study.

6.1 Workforce and Morale

A broad range of drivers likely influence the workforce morale of junior doctors and shape their responses around intentions and behaviours. These drivers may operate in different directions, and with different magnitudes, so it is very difficult to disentangle the impact of a specific driver in isolation. It is not possible to conclude. therefore, that a policy had no impact as it may be countered by other factors that drive intentions and behaviour.

6.1.1 Spending on the NHS

The political salience of the NHS is potentially significant with public support strongly behind a national health system that is funded by tax, free at the point of delivery and provides comprehensive care for all citizens. Any public dissatisfaction with NHS funding levels, waiting times or service quality is echoed in widespread media coverage, and reporting of public attitudes and media coverage of healthcare will shape the morale of NHS staff, including junior doctors. Under the Labour government from 1997–98, real growth in health spending accelerated giving rise to the longest period of sustained real spending growth in NHS history. In 2010/11 growth in health spending stalled, although it has begun to increase in subsequent years.[8] The Office for Budget Responsibility suggests that the NHS's budget needs to rise from £140bn in 2020 to £228bn in 2066 to match rising healthcare demand.[9] A decade of NHS funding growth during the 2000s was accompanied by increasing levels of public satisfaction, which reached a peak in 2010 at 70 per cent. Although satisfaction in 2015 is still high by historic standards, it is now nine percentage points below its 2010

[8] IFS (2015) Health Spending
https://www.ifs.org.uk/tools_and_resources/fiscal_facts/public_spending_survey/health_spending
[9] Office for Budget Responsibility (2017) Fiscal sustainability report – January 2017, OBR.

peak.[10] British Social Attitudes survey series evidence suggests satisfaction with GP services continues to be higher than for other NHS services. However, a satisfaction rate of 69 per cent in 2015 was the lowest rate recorded since the survey began in 1983.[11] Most respondents are able to draw on their personal experience of GP services when answering this question – on average people visit their GP every two months. However, their views may also have been influenced by a plethora of negative media stories about pressures in General Practice.[12]

We could hypothesise that health spending trends – and rises in public satisfaction when growth in NHS spending is high, and falls when NHS growth declines – will shape cohort respondents' views about working in the NHS and their behaviours. For example, the changes in NHS spending since 2010 and fall in public satisfaction since that time could reasonably be seen as drivers that encourage junior doctors to look outside the NHS, including overseas, within the independent sector, and for non-clinical career opportunities.

The evidence from the cohort suggests that as time progresses, *intention* to work outside the NHS as part of their medical careers (e.g. in the independent sector) increases: almost a third of those who did not consider it at the beginning of their training, intend to do so 6 years later (by 2012); a finding which could give some support to the tentative hypothesis. However, the vast majority of the junior doctors remain working as doctors in the UK 10 years after beginning their training despite such policy changes and public attitudes. Only about 5 per cent of the junior doctors spent any time working overseas. The cohort study suggests that junior doctors' interest in international professional mobility, either on a temporary or a permanent basis, wanes over time. There is also relative stability over time in intentions to work outside the NHS in an alternative non-medical career: only around 6 per cent of those who did not consider it at the beginning of their training intend to do so 6 years later.

6.1.2 Pay

Since 2010 the UK has seen retrenchment within the public sector, and the priority for public finance has been reducing the deficit. Pay and conditions within the public sector, including healthcare, have come under scrutiny. In 2012 Government proposals to reform doctors' pensions were met with industrial action that involved large numbers of GPs and hospital doctors refusing to undertake

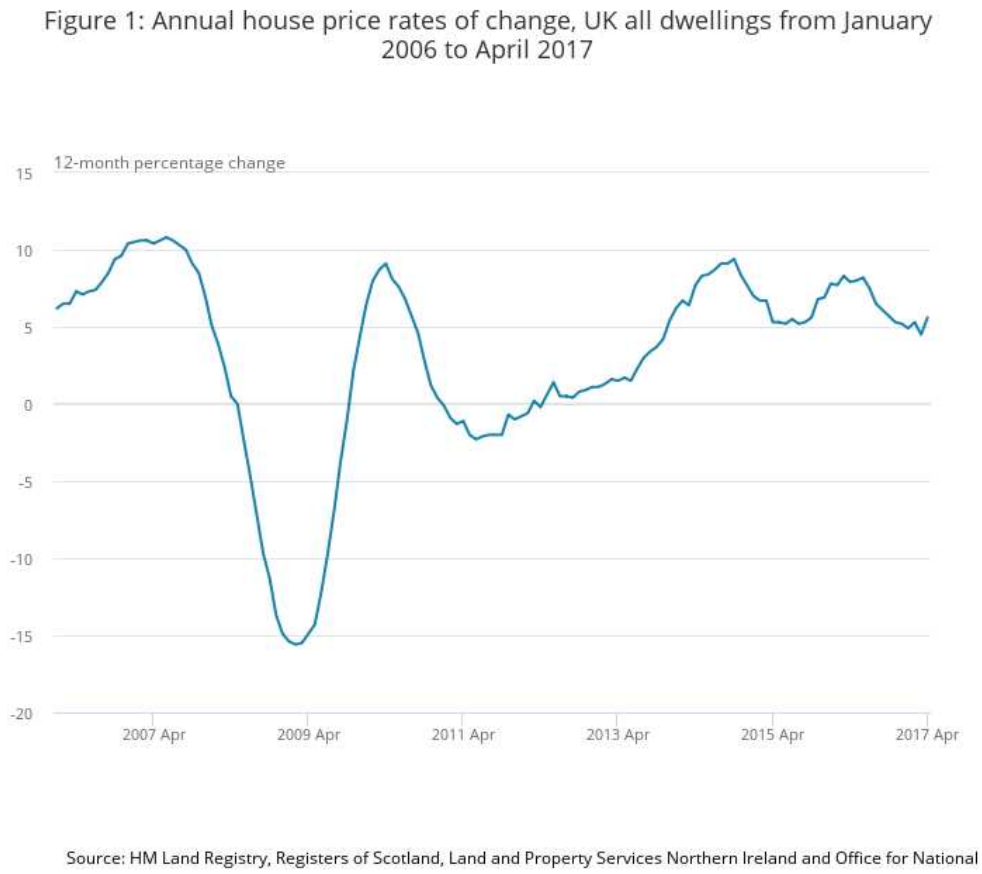
[10] Appleby, J. and Robertson, R. (2016) *Public satisfaction with the NHS in 2015 Results and trends from the British Social Attitudes survey*, King's Fund.
[11] Appleby, J. and Robertson, R. (2016) *Public satisfaction with the NHS in 2015 Results and trends from the British Social Attitudes survey*, King's Fund.
[12] Appleby, J. and Robertson, R. (2016) *Public satisfaction with the NHS in 2015 Results and trends from the British Social Attitudes survey*, King's Fund.

routine procedures.[13] Against this backdrop, NHS GP and hospital doctors were subject to the public sector's pay freeze in financial years 2011/12 and 2012/13. With the annual inflation rate in 2011 and 2012 reaching 5.2 per cent and 3.2 per cent respectively, this resulted in a pay cut in real terms for doctors.[14] NHS doctors' pay freeze was followed by a 1 per cent increase in their pay in the financial year 2013/14. Since then there have been 3 years of pay restraint, with only those who are not eligible for incremental pay (e.g. at the top of their pay scale) receiving 1 per cent non-consolidated payment. Over the three years, average NHS hospital FTE doctors' basic payment increased by 0.8 per cent, 0.6 per cent and 0.4 per cent[15], while the annual inflation rate was 3 per cent, 2.4 per cent and 1 per cent respectively.[16] Pay restraint should also be seen alongside the evidence on house price rises whereby in the decade to March 2017, the percentage change in house prices (not adjusted for inflation) was 17 per cent (see Figure 6.1).[17] Similarly, within the rental market between January 2011 and January 2017, private rental prices in Great Britain rose by 14.3 per cent (when London is excluded, the increase was 10.1 per cent over the same period).[18]

Given such factors affecting doctors' personal finances, we might hypothesise that higher pay outside the NHS and/or in health systems in other parts of the world,[19] would lead to an increase in the numbers of doctors leaving for any reason, or at least in stating their intentions to leave. Evidence from the cohort suggests, however, that there is dissonance between intention and behavior: whilst intention to work outside the NHS as part of their medical careers does increase, this is not matched by behavior change with the vast majority of the junior doctors remaining working as doctors in the UK after 10 years. Only about 5 per cent of the junior doctors spent any time working overseas.

[13] https://www.theguardian.com/society/blog/2012/jun/21/doctors-strike-pensions-live-coverage
https://www.theguardian.com/society/2012/jun/21/doctors-strike-pensions-hospitals-gp-surgeries
[14] Office of National Statistics - https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/czbh/mm23
[15] NHS Digital (2016) 'NHS Staff Earnings Estimates to March 2016 - Provisional statistics', http://content.digital.nhs.uk/searchcatalogue?productid=21187&topics=1%2fWorkforce%2fStaff+earnings&sort=Relevance&size=10&page=1#top
[16] Office of National Statistics - https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/czbh/mm23
[17] Increases to tuition fees (fees of up to £3000 a year for students enrolling on courses from September 2006 or £9000 in 2012) do not impact on the cohort given they would have finished their undergraduate studies by the time fee increases were implemented.
[18] Office of National Statistics (2017) Statistical bulletin: Index of private housing rental prices (IPHRP) in Great Britain: Jan 2017, ONS.
[19] OECD (2013) Remuneration of doctors and nurses: progress and persisting issues, Joint Session of Health Data Correspondents and Health Accounts Experts, 17 October 2013, Paris.

Figure 6.1: Annual house price rates of change, UK all dwellings, January 2006-April 2017



6.1.3 Working hours

A 2012 survey found that UK hospital doctors were working more hours than before. Junior doctors worked far more than their contracted hours: in their last full placement, doctors in training reported 50.1 hours per week against their average planned 45.1 hours. In 2012, 59 per cent of consultants and 86 per cent of GPs reported that their workload had intensified over the past year. Likewise, 40 per cent of consultants and 77 per cent of GPs reported that their work had become more complex over the same time period, a similar picture was found among SAS doctors and junior doctors.[20]

In 2004, the European Working Time Directive (EWTD) provisions extended to junior doctors, whose maximum working hours had to be reduced to 56 by August 2007 and to 48 hours from August 2009, averaged over 26 weeks. Doctors in training have an individual right to opt-out, however, the contracts for doctors in training stipulate that overall hours must not exceed 56 hours in a week across

[20] BMA (2016) BMA member briefing for the 3 May 2016 Special Representative Meeting

all their employment and locum activity.[21] The reduced working hours has seen many specialties move to shift-pattern working, potentially impacting adversely on training.[22] Surveys of 2002[23] and 1999-2000[24] cohorts reported an overall negative attitude towards the EWTD. While 62 per cent of respondents to one survey reported a positive effect upon work-life balance, 71 per cent reported a negative effect upon training.[25]

This mixed picture (benefits for work-life balance but adverse impacts on training) could support changes to intentions and behaviour in both directions. The greater likelihood is that as time progresses it would potentially reduce intention to work outside the NHS as part of their medical careers. Yet evidence suggests that intention to work outside the NHS as part of their medical careers (e.g. in the independent sector) increases over time. It is thus difficult to discern a clear impact of the EWTD on intention and behaviour within the study with regards to international professional mobility, work outside the NHS, or alternative non-medical careers.

6.1.4 Staffing/ workload

There are not enough doctors-in-training, and between 2013 and 2015 the number of doctor vacancies rose by 60 per cent.[26] More than four in ten doctors in training report a heavy or very heavy workload, and 91 per cent of doctors report that their workloads have increased over the last 5 years. Six out of ten doctors-in-training work above their rostered hours on a daily or weekly basis. On average trainees would work an extra 5 weeks per year. Four out of five doctors-in-training report that their job often or sometimes leads to excessive stress, and half of consultants report practising under excessive pressure.[27]

The Royal College of Physicians (2016) pointed to a number of challenges facing junior doctors[28]:

[21] EWTD Reference Group (2009) *A guide to the implications of the European Working Time Directive for doctors in training*, p.5)
[22] Royal College of Physicians (2013) *Hospital workforce Fit for the future?* A report by the Royal College of Physicians, March.
[23] Lambert, T.W., Smith, F. and Goldacre, M.J. (2016) The impact of the European Working Time Directive 10 years on: views of the UK medical graduates of 2002 surveyed in 2013–2014, *JRSM Open*, 7, 3
[24] Maisonneuve, J.J., Lambert, T.W. and Goldacre, M.J. (2014) UK doctors' views on the implementation of the European Working Time Directive as applied to medical practice: a quantitative analysis, *BMJ Open* 2014;4:e004391
[25] Lambert, T.W., Smith, F. and Goldacre, M.J. (2016) The impact of the European Working Time Directive 10 years on: views of the UK medical graduates of 2002 surveyed in 2013–2014, *JRSM Open*, 7, 3
See also: General Medical Council (2012) *2012 National Training Survey*, GMC.
[26] Royal College of Physicians (2016) *Underfunded, underdoctored, overstretched: The NHS in 2016*, London: RCP. https://www.rcplondon.ac.uk/guidelines-policy/underfunded-underdoctored-overstretched-nhs-2016
[27] Royal College of Physicians (2016) *Underfunded, underdoctored, overstretched: The NHS in 2016*, London: RCP. https://www.rcplondon.ac.uk/guidelines-policy/underfunded-underdoctored-overstretched-nhs-2016
[28] Royal College of Physicians (2016) *Being a junior doctor: Experiences from the front-line of the NHS*, London: Royal College of Physicians.

- 7 in 10 junior doctors work on a rota that has a permanent gap;
- 96 per cent of junior doctors feel valued by the patients they care for, but feel that they spend too much time away from them: 41 per cent of junior doctors report that the burden of excessive administrative work poses a serious risk to patient safety in their hospital;
- Four in five junior doctors regularly experience excessive stress because of their job. One in four junior doctors report that their role has had a serious impact on their mental health.

There is recognition that GPs face growing workload. A King's Fund survey captured data from 177 practices at 2010/11–2014/15 and suggested 'GP workload has grown hugely, both in volume and complexity'. The study identified a 15 per cent overall increase in contacts: a 13 per cent increase in face-to-face contacts and a 63 per cent rise in telephone contacts. In three years, the numbers waiting at least a week to see a GP has risen by almost one third.[29]

Trends in consultation point to a growing GP workload. A recent retrospective study of English General Practice found a substantial increase over the period 2007-14 in practice consultation rates, average consultation duration, and total patient-facing clinical workload.[30] The BMA points to increasing demands being put on GPs. In its survey of GPs across the UK responses suggested that full time GPs were working around 47 hours per week including administrative duties; higher than the average 44.4 hours per week reported in 2006/7. The BMA cite a 2012 survey where 86 per cent of GPs reported that their workload had increased in intensity over the past year. Similarly, 77 per cent of GPs reported that their work had become more complex over the same time period.[31] The BMA Survey of 2015 reported that 34 per cent of GPs were hoping to retire in the next 5 years [32], although those aged 60+ make up just 9 per cent of GP workforce.[33]

Given these drivers it would be reasonable to hypothesise an impact on morale that would shape junior doctors' intentions and behaviours in ways that are detrimental to the NHS. To reiterate, however, there is dissonance between behaviour and intention: whilst intention to work outside the NHS as part of their medical careers increases this is not matched by behaviour change with the vast majority of the junior doctors remaining working as doctors in the UK after 10 years. What about

[29] Baird B, et al. (2016) *Understanding pressures in general practice*. London: The King's Fund.
[30] Hobbs, F.D.R. et al (2016) 'Clinical workload in UK primary care: a retrospective analysis of 100 million consultations in England 2007-2014', *The Lancet*, 387, No. 10035, pgs 2323-2330, http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)00620-6/abstract
[31] BMA (2016) BMA member briefing for the 3 May 2016 Special Representative Meeting
[32] ICM Unlimited (2015) Survey for BMA.
[33] BMA (2015) *BMA 2014 Medical Workforce Briefing*, BMA.

General Practice more specifically given the particular pressures outlined above? We could expect junior doctors' responses to reflect a growing dissatisfaction with General Practice given the workload issues. The evidence in respect of General Practice from the longitudinal analysis again reflects the dissonance. Thus, on the one hand, if we consider *intentions*, General Practice faces the largest retreat as time elapses from commencement of training, with only 10 per cent of those who began their training wanting to be a GP, retaining that goal ten years later. On the other hand, however, if we consider *behaviour*, General Practice is the most stable speciality, with virtually no movement out of General Practice over the period for which we have data. In the same period, about 5 per cent of those working in Hospital Practice moved into General Practice. Whilst for the 2006 cohort of junior doctors, intentions to exit General Practice did not translate into behaviour, policy makers arguably should always be cognoscente of the factors contributing to junior doctors' declining intentions towards General Practice. Moreover, in the context of an apparent widespread dissatisfaction it is important to be mindful that particular developments such as a 7-day NHS (perhaps combined with continued pay restraint), recruitment campaigns by overseas health systems (discussed below), increasing administrative burdens or critical political discourse may act as a 'tipping point' for translating intentions into behaviour for all junior doctors.

6.1.5 Recruitment

Given the slowdown in NHS investment and the implementation of the EWTD there is growing concern about shortfalls in the medical workforce and its ability to meet the increased demands. For example, GPs are increasingly opting for 'portfolio careers' or part-time work. Only 11 per cent of GP trainees surveyed intend to do full-time clinical work five years after qualification.[34] The GP workforce grew by 4.75 per cent and the practice nurse workforce by 2.85 per cent over the same period 2010/11-2014/15.[35]

In 2015, just over one-third of registered doctors in the UK and 15 per cent of doctors in training had gained their primary medical qualification abroad. Of the former, 70 per cent had qualified outside the European Economic Area (EEA), and of the latter, the corresponding figure was 75 per cent.[36] Recruitment of the medical workforce, therefore, is in part dependent on the UK migration regime, which governs the rules under which people from outside the EEA are entitled to enter, reside and settle in the UK and what their labour market, welfare and family rights are when here. With the

[34] Baird B, et al. (2016) *Understanding pressures in general practice*. London: The King's Fund.
[35] Baird B, et al. (2016) *Understanding pressures in general practice*. London: The King's Fund.
[36] GMC (2016) The State of Medical Education and Practice in the UK 2016. http://www.gmc-uk.org/SOMEP_2016_Full_Report_Lo_Res.pdf_68139324.pdf

broad aims of reducing net migration and restricting entry to those deemed to be of economic value to the UK, the UK migration regime has undergone a raft of policy changes in the life-time of the 2006 cohort. Most significant among these have been: the introduction of the Points Based System in 2008, which included a category for sponsored skilled workers (Tier 2); a series of changes between 2012 and 2016, which reduced the maximum permitted length of stay of those on a Tier 2 visa, extended the waiting period for settlement, and introduced a maintenance requirement and a health-care surcharge for dependents accompanying Tier 2 migrants; and increasing conditions on sponsorship of family members, including spouses, children and parents, from abroad for UK citizens and settled persons.[37] We might expect such changes to reduce recruitment from overseas and lead to more doctors returning to their countries of origin, thereby increasing rota-gaps and hence workload on remaining trainees.

The strain on UK health workforce planning in primary and secondary care is being exacerbated by the emigration of UK-qualified Health Care Professionals (HCPs). General Medical Council figures indicate that the number of UK-qualified doctors issued with a Certificate of Current Professional Status, which allows them to practise abroad, increased by 22 per cent between 2008 and 2013. While Australia and New Zealand are the most common intended destinations, there is evidence of diversification, including East Asia and United Arab Emirates.[38] Since 2008 at least 23,823 doctors have requested the documents; such a request signals interest in working overseas (and possibly dissatisfaction with NHS employment), but such interest may not equate to actual moves overseas. Whilst not all those requesting a Certificate of Current Professional Status will go on to practice overseas, there is evidence from overseas health systems of significant mobility. The Australian Medical Council has awarded certificates of Advanced Standing to over 5,500 UK doctors since 2006, and 2,200 of these have gone on to complete the 12-month supervised performance assessments that leads to general registration. The Medical Council of New Zealand reported that 469 doctors were added to the New Zealand medical register in 2013 and 511 in 2012.[39]

Again, as with changes to immigration policy, we might expect emigration to increase rota-gaps and hence workload on remaining trainees with subsequent changes to their intentions and behaviours (including opting to work in the independent sector or overseas). Evidence from the cohort suggests

[37] Kilkey, M. (2017) 'Conditioning Family-life at the Intersection of Migration and Welfare: The Implications for 'Brexit Families'', *Journal of Social Policy*, DOI: https://doi.org/10.1017/S004727941700037X
[38] General Medical Council (GMC) (2014) *The state of medical education and practice in the UK 2014* (pp.57-58) www.gmc-uk.org/somep2014 [accessed 14.07.2017].
[39] Kenny, C. (2014) 5,000 doctors a year considering leaving the UK to emigrate abroad, *Pulse*, 28 July.

that junior doctors' interest in international professional mobility, either on a temporary or a permanent basis, wanes over time. In terms of behaviours, about 5 per cent of the junior doctors spent any time working overseas. (This concurs with conclusions drawn by other studies that junior doctors are no more likely to abandon their training and leave the profession than previously[40]). As noted above, intention to work outside the NHS as part of their medical careers may increase, but the vast majority of the junior doctors remain working as doctors in the UK after 10 years.

6.2 Gendered career trajectories

NHS medical practice is a profession experiencing an increasing proportion of female doctors that is edging closer to making up 50 per cent of the register, with a 45 per cent share in 2015 compared with 38 per cent in 2007.[41] This trend is even more obvious in the younger generation of the medical workforce, with female's share of doctors in training rising to 57 per cent in 2015.[42] Despite the increasing presence of women in the medical workforce, the findings presented in this report point to deeply gendered career trajectories.

6.2.1 Gendered barriers

The gradual drift during training of female junior doctors out of hospital-based specialisms and towards General Practice identified in the 2006 cohort may be symptomatic of horizontal barriers in specialist training. The proportion of specialists who are female was only 34 per cent in 2015, although it had increased from 30 per cent in 2010. There are only two specialities now that have more than 50 per cent female doctors: in obstetrics and gynaecology, the proportion has risen from 42 to 51 per cent, and in paediatrics it has risen from 49 to 52 per cent. But certain specialities remain male-dominated. Surgery continues to have the lowest proportion of female doctors (12 per cent, up from 9 per cent), followed by ophthalmology (28 per cent, up from 25 per cent).[43]

Research identifies significant sex differences in the perception of surgical careers. Surveying newly qualified graduates from the University of Nottingham Medical School, male respondents were significantly more likely to rate surgery as an attractive or very attractive career. Overall, only 25 per cent of female doctors expressed interest in a surgical career as opposed to 42 per cent of male doctors. Frequently cited reasons for non-interest among women included: no interest in surgery itself and

[40] Goldacre, M., Davidson, J. and Lambert, T. (2010) The junior doctor exodus, *BMJ Careers*, 20 Oct 2010
[41] GMC (2017) *List of Registered Medical Practitioners - Statistics http://www.gmc-uk.org/doctors/register/search_stats.asp*
[42] GMC (2016) *The state of medical education and practice in the UK, 2016* http://www.gmc-uk.org/SOMEP_2016_Full_Report_Lo_Res.pdf_68139324.pdf
[43] GMC (2016) *The state of medical education and practice in the UK, 2015* http://www.gmc-uk.org/SOMEP_2015.pdf_63501874.pdf

negative attitudes toward women in surgery among the surgical teams. Irrespective of career interests, 59 per cent of male and 68 per cent of female respondents believed surgery was not a career welcoming women. Reasons included difficulty maintaining family life, limited flexible training, and lack of role models.[44]

The finding among the 2006 cohort that over-time women shifted to a much greater extent than men their intentions and behaviour from hospital specialities towards General Practice, thus, may reflect certain characteristics of the latter, including ability to take a career break and greater flexibility over working patterns more generally, more regular hours, less out of hours working, the shorter training programme and availability of female role models.

The gendered pattern of career progression towards consultant grade found among the 2006 cohort might suggest vertical, as well as horizontal, barriers for women in the medical profession. Thus, for example, we found clear evidence of higher rates of women than men who aspired to be consultants at the outset of their training opting for SAS level appointments as time progressed. The wider evidence also indicates that women make up only 34 per cent of consultants, and the attrition rate of female consultants is also found to be higher than at other grades.[45] In General Practice, where women make up 52 per cent of the overall GP workforce and 70 per cent of salaried GPs, they constitute 39 per cent of GP providers. While the proportion of female GP providers has increased from 35 per cent in 2006, female doctors added to the GP workforce in the last decade were mainly to fill salaried GPs posts.[46]

6.2.2 Career breaks

Gendered patterns found among the 2006 cohort over time also include the different career path female doctors usually have compared to their male counterparts, with more women than men taking career breaks and taking longer breaks. The wider evidence also finds that women's careers follow

[44] Fitzgerald, J.E. et al (2013) 'Gender-related perceptions of careers in surgery among new medical graduates: results of a cross-sectional study', *The American Journal of Surgery*, 206: 1, 112-19. http://www.americanjournalofsurgery.com/article/S0002-9610%2812%2900337-6/fulltext

[45] DoH (2009) *Women Doctors: making a difference*. Report of the Chair of the National Working Group on Women in Medicine, https://hee.nhs.uk/sites/default/files/documents/WIMreport.pdf

[46] NHS Digital (2017) *General and Personal Medical Services, England 2006-2016, as at 30 September, Experimental statistics*, http://www.content.digital.nhs.uk/searchcatalogue?productid=24768&q=general+medical+&sort=Relevance&size=10&page=1#top

more variable paths than men's, with periods of full-time and periods of varying degrees of part-time with maternity leaves or career breaks.[47]

A Women in Academic Medicine (WAM) report shows that 45 per cent of doctors who were working or had worked in the NHS, Universities and other health care systems have taken a career break since their first appointment to the profession. The majority of female doctors (58 per cent) have taken a career break compared with only 10 per cent of males, and men have much shorter career breaks than women.[48] In the Cohort Study, 28 per cent of female junior doctors had taken a career break at some point between 2009 and 2015; this compares to a figure of 10 per cent among their male counterparts. Moreover, among the 2006 cohort, 19 per cent of women who reported being on a career break in 2009 were still on a break in 2015, compared with an equivalent figure among men of only 3 per cent.

Research also indicates that women more frequently experience difficulties in returning to work from a career break than males. The most common hindering factors include: personal feelings; job arrangement (lack of jobs, unable/difficult to relocate, unable to work full time, long commuting time); lack of funds for childcare out of hours, to pay professional fees or research; childcare (nannies leaving, co-ordinating on-call, work outside normal nursery hours); attitude of peers and senior colleagues (described as 'hostile', 'negative', 'reluctant to give back career honours'). The most important factors in helping the transition back to work are: the availability of good childcare; flexible working; keeping in touch with the department while away; and less than full time working building up back to full time.[49]

6.2.3 Flexible training

Flexible working arrangements, therefore, may be an important strategy to help reconcile work and family life among (female) doctors. In addition to the career break scheme, doctors in training are able to work less than full-time (LTFT). While the Cohort Study did not ask participants if they were LTFT, other research finds that the most common reason to work LTFT is to care for children, and thus the number of flexible trainees tends to reflect the number of women doctors in a speciality – paediatrics and general practice have the largest number of LTFT trainees.[50]

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[47] DoH (2009) *Women Doctors: making a difference.* Report of the Chair of the National Working Group of Women in Medicine, https://hee.nhs.uk/sites/default/files/documents/WIMreport.pdf

[48]The Medical Women's Federation (2013) *Career Breaks for NHS and University Doctors: Analysis of the WAM Database*, http://www.medicalwomensfederation.org.uk/images/Career_Breaks_Report.pdf

[49]The Medical Women's Federation (2013) *Career Breaks for NHS and University Doctors: Analysis of the WAM Database*, http://www.medicalwomensfederation.org.uk/images/Career_Breaks_Report.pdf

[50] Topley, R. et al. (2012) Trainees' tales of less than full-time training, *BMJ Careers*, http://careers.bmj.com/careers/advice/Trainees%E2%80%99_tales_of_less_than_full_time_training;

While there is evidence that LTFT trainees have marginally higher overall satisfaction and are marginally more satisfied with their clinical supervision[51], there is also evidence suggesting that part-time trainees face difficulties in arranging posts, ensuring funding, getting educational approval, negotiating appropriate training in each rotation and simply managing the problems of the geographical movement required every six or twelve months during the training period. In addition, those trying to slot-share, particularly in sub-specialities, are often faced with problems in finding a partner as it requires a large number of part-time trainees in a particular speciality and geographical area for pairing up. Other challenges for trainees include: inflexibility from the standard 50 or 60 per cent model of part-time training; getting exposure to appropriate training as a part-timer; finding time for study, research and audit; finding time for non-clinical activities for continuing professional development; discontinuity of care for patients and colleagues' willingness to redesign working practices; and fear of adverse effects on subsequent career progress.[52]

6.2.4 Statutory provisions around reconciling work and family life

Beyond the training and employment practices of the NHS itself, there is a statutory policy environment around reconciling work and family life, changes and / or trends in which may have impacted the 2006 cohort over the ten years.[53] One of the most significant developments in this policy area was the introduction in April 2011 of Additional Paternity Leave, allowing mothers to transfer up to 26 weeks of maternity leave to the father.[54] This might be expected to have a number of effects on the cohort: for example, enabling female trainees to return to work quicker after childbirth, increasing the number of female trainees choosing traditionally 'women-unfriendly' specialities, such as surgery, and leading to a scenario in which having children impacts on men's career trajectories. Such effects, however, cannot be observed in the data. This is not surprising when we consider that take-up in general of Additional Paternity Leave was miniscule, with just 1.4 per cent of all new fathers taking it in 2012/13.[55]

BMA (2015) *Less than full time training guidance,* https://www.bma.org.uk/-/media/files/pdfs/developing%20your%20career/bma%20less%20than%20full%20time%20guidance%20-%20appendix%202.pdf?la=en).

[51] BMA (2015) *Less than full time training guidance,* https://www.bma.org.uk/-/media/files/pdfs/developing%20your%20career/bma%20less%20than%20full%20time%20guidance%20-%20appendix%202.pdf?la=en).

[52] The Medical Women's Federation (2013) *Career Breaks for NHS and University Doctors: Analysis of the WAM Database,* http://www.medicalwomensfederation.org.uk/images/Career_Breaks_Report.pdf

[53] This includes the EWTD discussed above.

[54] This was reformed in April 2015 to Shared Parental Leave.

[55] http://www.bbc.co.uk/news/uk-politics-27838255.

The relationship between childcare affordability and maternal employment patterns (rate and hours) internationally is well-established[56], and there is no reason to assume that UK doctors are immune from this. We might expect, therefore, that the above-inflation rises in average childcare costs experienced in Britain in each year between 2008 and 2015[57], particularly in later years in the context of the NHS pay freeze and the one per cent pay increase cap thereafter, to influence the cohort's intentions and behaviour in a number of ways: for example, switching to a shorter training programme (such as General Practice) in order to achieve a higher income more quickly, selecting a speciality (again, such as General Practice) amenable to 'shift parenting' so that the need for childcare could be reduced, or taking and/or extending a career break to avoid childcare costs. While such behaviour is observable among the cohort, particularly among women, it is not possible from the existing data to attribute this to trends in childcare costs.

[56] Thompson, S. and Ben-Galim, D. (2014) *Childmind the Gap. Reforming Childcare to Support Mothers into Work*, London: IPPR. http://www.nuffieldfoundation.org/sites/default/files/files/childmind-the-gap_Feb2014.pdf
[57] Rutter, J. (2016) *Childcare Survey*, London: Family and Childcare Trust. https://www.familyandchildcaretrust.org/childcare-survey-and-holiday-childcare-survey

7. RECOMMENDATIONS FOR FURTHER RESEARCH

As noted in the Introduction to this report, there is a number of areas related to career trajectories of junior doctors that we were not able to examine satisfactorily due to data limitations. These include the important topics of ethnicity and flexible working patterns, including full-time versus part-time. Any future quantitative research undertaken, whether a new cohort study or standalone topic-related pieces of research, should ensure that the research design, sample sizes in particular, is such that it permits robust analysis when drilling down by for example, ethnicity or part-time workers. The current analysis revealed significant dissonance between intentions and behaviours. While the various surveys on for example, work satisfaction, tell us about why people have intentions (for example, stress, dissatisfaction with workload), we do not know enough about why intentions are not acted upon, and whether this could be likely to change. Detailed qualitative research, either retrospectively of the 2006 cohort or standalone, is required to unpack this complex relationship between intentions and behaviour. Such research needs to include analysis of the impact of changes in junior doctors' work environment caused by reform to health and other policy areas such as migration and family policy. Moreover, given the very strong gendered pattern of career trajectories found, more research is required on understanding the particular barriers faced by women, and the reforms required to address in particular the impact of childcare responsibilities on women's medical careers.

Three further topics seem important, yet there is little or no wider research evidence on them. The first is the impact of **geography** on career trajectories. After almost twenty years of devolution, which gave power over health policy to each of the devolved governments, while doctors' contracts are quite similar across the four nations of the UK, the wider environment of the NHS now varies considerably between England, Wales, Scotland and Northern Ireland.[58] The extent to which such differences are drivers of internal mobility, for example, among junior doctors merits investigation. The wider socio-economic landscape also varies considerably across the UK and within the four nations, and evidence points for example to geographical differences in staffing shortfalls across England.[59] Investigating the impact of for example, housing costs, on junior doctors' behaviour is an interesting area for further research.

The **international mobility** of doctors warrants further research. In the context of the 2015/16 junior doctors' industrial action, there was widespread media coverage of increased applications for the

[58] Bevan, G. et al. (2017) *The Four Health Systems of the United Kingdom. How do they compare?* Nuffield Trust. https://www.nuffieldtrust.org.uk/files/2017-01/4-countries-summary-web-final.pdf

[59] National Audit Office (2016) *Managing the Supply of NHS Clinical Staff in England* https://www.nao.org.uk/wp-content/uploads/2016/02/Managing-the-supply-of-NHS-clinical-staff-in-England.pdf

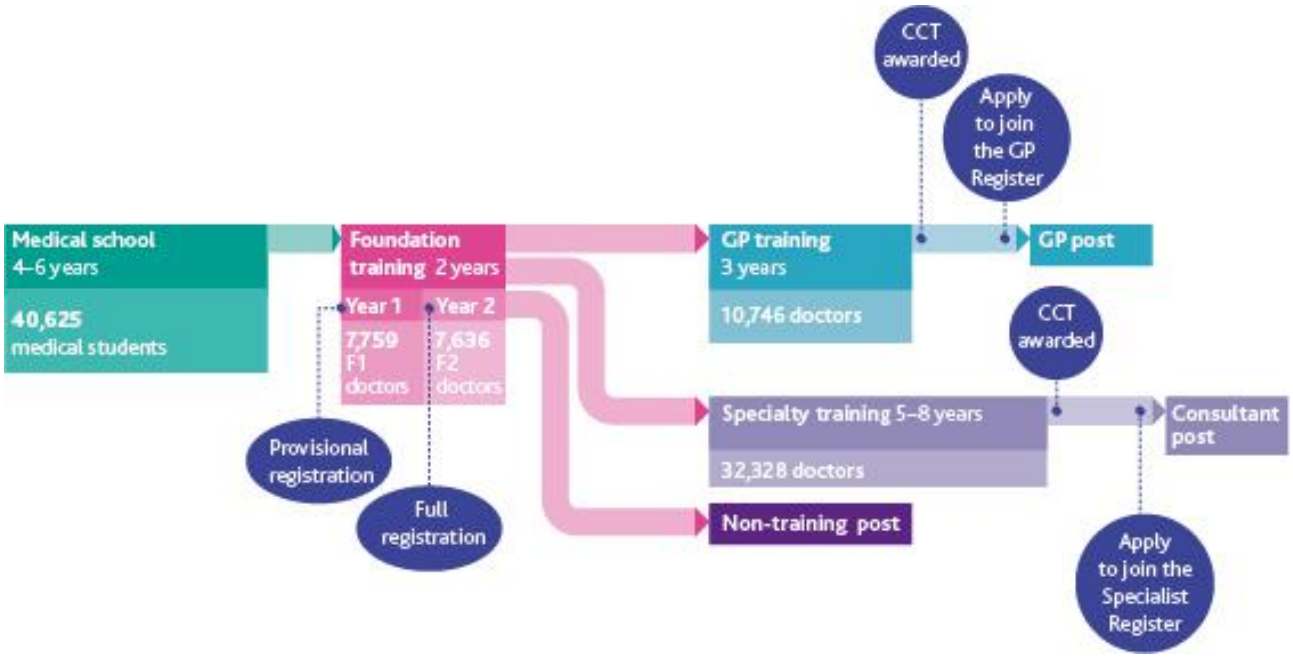
Certificate of Current Professional Status that would allow doctors to practise overseas.[60] Yet, we know little or nothing about subsequent behaviour in terms of: rates of departure; motivations for moving overseas to practise; countries of destination; experiences while abroad; rates of return; and patterns and experiences of re-integration in the NHS. Such knowledge could usefully inform the NHS' current efforts to encourage doctors' return from abroad.[61] Facilitating return of UK-trained doctors is likely to take on more significance in the context of Brexit, which will bring further reform to the UK's migration regime and will have as yet unknown impact on workforce supply from the European Economic Area and more globally. Research is required, therefore, to understand how Brexit will affect the current and future medical workforce, from both within and beyond Europe.

[60] For example: http://www.independent.co.uk/life-style/health-and-families/health-news/numbers-of-nhs-doctors-registering-to-work-overseas-could-reach-unprecedented-record-10511755.html

[61] For example, http://www.bma.org.uk/news-views-analysis/news/2015/august/nhs-brain-drain-why-the-busmans-holidays

8. APPENDICES

8.1 Appendix 1: Figure 8.1 The medical education pathway for doctors in training across the UK



Source: GMC 2015

8.2 Appendix 2: Variables used in the longitudinal analysis (descriptive and multivariate)

Table 8.1. Description of variables

Variable (in dataset)	Description	Years
careergoal	Which of the following is your ultimate career goal?	2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015
areamed	Which general area of medicine is your preferred career option?	2006, 2007, 2008, 2009, 2010, 2011
tempuk, practise, practice	Do you intend to practise medicine outside the UK, either temporarily or permanently, in the future?	2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015
workoutside	Do you envisage working outside of the NHS at any point in your career?	2006, 2007, 2008, 2009, 2010, 2011
continuedtowork, workuk, cotinueduk travelledoverseas, traveloverseas break, takenbreak leftmedicine, left	Series of filter questions used in the analysis after creating a single variable to investigate career moves of junior doctors over time	2009, 2010, 2011, 2012, 2013, 2014, 2015
currentspec, currentspeciality, currentspecialty	Current specialty	2011, 2012, 2013, 2014, 2015
gradeaug09, gradeaug10, gradeaug11, gradeaug12, gradeaug13, gradeaug14	What was your grade in the previous year (august)?	2010, 2011, 2012, 2013, 2014, 2015

Source: 2006 BMA Junior Doctors Cohort Panel.

8.3 Appendix 3: How to interpret the transition matrices of the descriptive analysis

8.3.1 Explaining the time dimension/comparison used in the transition descriptive tables

The main feature of panel surveys over cross-sectional ones is that the sample units (usually individuals) are surveyed repeatedly for a period of time in regular intervals (usually once a year during the duration of the study). This allows us to investigate patterns of change and stability in the dimensions considered in the study. This can be done by comparing what individuals have responded between years and calculating the percentages of stability and change in those response patterns. In descriptive analysis this is done via transition matrices where we cross-tabulate what an individual has responded in respect of a certain variable at one point in time and what they have responded at another later time point.

There are two ways to do these transition matrices:

- **Option 1**: They can be done looking at the pattern of change and stability between specific years, for instance between 2006 and 2007
- **Option 2**: They can be done between specific time periods, for instance, between t and t+1.

Option 1 makes sense if, for instance, there are substantive reasons to believe that the patterns of change and stability analysed can be related or explained with something that has happened between those two years that may have affected the way people responded to that specific dimension we are looking at, for instance, a policy change. This option, however, has a main drawback which is that we only work with a very limited number of respondents, those providing valid answers to that specific variable in the two years considered.

Option 2 is the most common way to look at patterns of change and stability in panel data since it allows us to look at those in regular intervals and maximise the number of observations. In this case it is only time that matters as the driver to explain those patterns, rather than something substantive happening at specific time intervals. This method has a main advantage in maximising the number of observation in the transition analysis making the analysis more accurate and more reliable in statistical terms.

In Table 8.2 below we show what the two different methods imply in terms of the use of the data for transition matrices analysis using the time span of the current data set. For instance, for a variable included in the ten years of the panel, if we are interested in looking at a transition between two specific consecutive years (Option 1) we will choose only those specific years in the panel and

compare (cross-tabulate) the patterns of responses of our chosen variable in those two years (2006 and 2007 in our example below). Instead, in Option 2 we focus on transitions taking place between t and t+1 across all years of the panel (not between two specific years). Substantively, between t and t+1 in Option 2 all the transitions involved are shown in the table. This option clearly maximizes the number of observations we work with and therefore the percentage of change and stability are more accurate.

Table 8.2. Comparing methods for transition matrices in panel analysis

Option 1		Option 2	
T	t+1	t	t+1
2006	2007	2006	2007
		2007	2008
		2008	2009
		2009	2010
		2010	2011
		2011	2012
		2012	2013
		2013	2014
		2014	2015

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

In the substantive example below we compare two transition matrices for Option 1 and Option 2 for our variable "ultimate career goal", which is present in the ten years of the study. For Option 1 we have chosen to look at years 2006 and 2007 as in our Table 8.2, and for Option 2 we have chosen to look at the overall transition between t and t+1 for the ten years of the panel.

In Option 1 (see Table 8.3) the total number of observations between the two years is 375, in Option 2 it is 3,088. In the first case there were 219 consultants in 2006, out of which 156 remain as consultants in 2007 (71.23 per cent). The remaining 29 per cent change their ultimate career goal in 2007. This 29 per cent is distributed across all other career goals.

For Option 2 (see Table 8.4) there were 1,602 consultants at t. 1,379 remain as consultants at t+1 (86.08 per cent). The remaining 14 per cent change their ultimate career goal to the others in that first row in the table between t and t+1.

Table 8.3. Option 1 for transition matrices

		2007					
		Consultant	SAS doctors	GP	Academic	Undecided/Other	Total
2006	Consultant	156	2	26	5	30	219
	%	71.23	0.91	11.87	2.28	13.7	100
	SAS doctors	2	1	1	0	0	4
	%	50	25	25	0	0	100
	GP	9	0	51	1	13	74
	%	12.16	0	68.92	1.35	17.57	100
	Academic	2	0	0	1	1	4
	%	50	0	0	25	25	100
	Undecided/Other	21	1	18	0	34	74
	%	28.38	1.35	24.32	0	45.95	100
	Total	190	4	96	7	78	375
	%	50.67	1.07	25.6	1.87	20.8	100

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

Table 8.4. Option 2 for transition matrices

		t+1					
		Consultants	SAS doctors	GP	Academic	Undecided/Other	Total
T	Consultants	1,379	26	56	57	84	1,602
	%	86.08	1.62	3.5	3.56	5.24	100
	SAS doctors	12	553	13	57	21	656
	%	1.83	84.3	1.98	8.69	3.2	100
	GP	45	71	155	21	37	329
	%	13.68	21.58	47.11	6.38	11.25	100
	Academic	45	42	23	96	13	219
	%	20.55	19.18	10.5	43.84	5.94	100
	Undecided/Other	77	38	42	29	96	282
	%	27.3	13.48	14.89	10.28	34.04	100
	Total	1,558	730	289	260	251	3,088
		50.45	23.64	9.36	8.42	8.13	100

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

8.3.2 Explaining the test used to report the statistical significance of the descriptive analysis

Pearson's χ^2

The chi-square test for independence, also called Pearson's chi-square test or the chi-square test of association, is used to discover if there is a relationship between two categorical variables (categorical variables can be also referred to as discrete or nominal variables) which are cross-tabulated for descriptive analysis.

In the analysis we have done since we are comparing what happens over time for a series of attitudinal and behavioural dimensions of the same sample of individuals, independence of the cross-tabulated dimensions is unlikely. This may partially explain why the Person's χ^2 tests are statistically significant even though it is also affected by sample attrition that takes place over time. However, this statistical test remains valid also to investigate whether there is a gender difference in the extent of associations found for male and female doctors with regards to the patterns of change and stability found over time in the attitudes and behaviours analysed. The focus on gender differences is the one we have taken when commenting on the results of the Pearson's χ^2 and Cramer's V tests.

Cramer's V

The Pearson's χ^2 Cramer's V is also a measure of association between two nominal variables, giving a value between 0 and +1 (inclusive). It is based on Pearson's chi-squared statistic that provides a numeric value for the association between the two cross-tabulated variables. Cramer's V varies from 0 (corresponding to no association between the variables) to 1 (complete association) and can reach 1 only when the two variables are equal to each other.

Finally the Cramer's V value is also affected by the sample size which explains that in our case the larger the time gaps analysed are and consequently the larger the sample attrition the Cramer's V drops. Yet, again, the purpose of reporting the Cramer's V for all transition tables is to identify whether there is a gender difference in the intensity of the association of the variables analysed over time. This is the substantive focus we adopt when commenting the results.

8.4 Appendix 4: Ethnic composition of the sample

Table 8.5. Ethnic composition of the sample (n=3,875)

Ethnic Background		%
White		84.49
Black Caribbean		0.13
Black African		0.65
Indian		4.93
Pakistani		1.75
Chinese		2.66
Iranian		0.75
Other		4.65
	Total	100

Source: 2006 BMA Junior Doctors Cohort Panel. Authors' own calculations.

8.5 Appendix 5: Multivariate analysis methods

The multivariate analysis undertaken uses two main methods. The first one relates to the panel structure of the data used. A panel data-set is characterised for having two sources of variation in the data. The one that takes place for each unit (in this case our junior doctors) over time, for instance in their intentions and behaviour. This is known as within variation. The second source of variation is the one that takes place between individuals at each point in time in the panel. For instance, the fact that we have male and female doctors interviewed each year. A random effect estimator like the one used in our multivariate analysis has one main advantage: it allows the estimation in the same models of variables that vary for each individual over time, and variables which do not vary for each individual and only vary between individuals. The alternative estimator, a fixed effects one, only uses the first source of variation in panel data (within variation), which means that those variables that do not vary over time for each individual in the sample (for instance, our dummy variable for ethnic background which is always the same for each junior doctor) could not be included in the analysis.[62]

The second method we use in our multivariate analysis is a probit estimator, given the binary nature of the dependent variables analysed. There are two main estimators for binary dependent variables: logit and probit. The only difference between them is the assumption they make about the distribution or shape of the error term. Since we are dealing with a sample of individuals there are various reasons why we need to consider the extent of statistical error in our analysis. For instance, it may be that some junior doctors in our sample do not accurately recall all the information they are asked each year, or that they consciously decided to report some information that is not accurate. The implication of this is that any statistical method applied to secondary data made up of a sample has to account for

62 Wooldridge, J. M. (2010) *Econometric analysis of cross section and panel data*. MIT Press.

statistical error in the analysis undertaken. A probit estimator assumes that the statistical error in our multivariate analysis follows a normal statistical distribution (a Gauss bell shape). A logit model assumes that the shape of the distribution of the error term is exponential. However, in substantive terms both logit and probit models provide comparable results with regards to the impact of the explanatory variables on the dependent variable(s) analysed.